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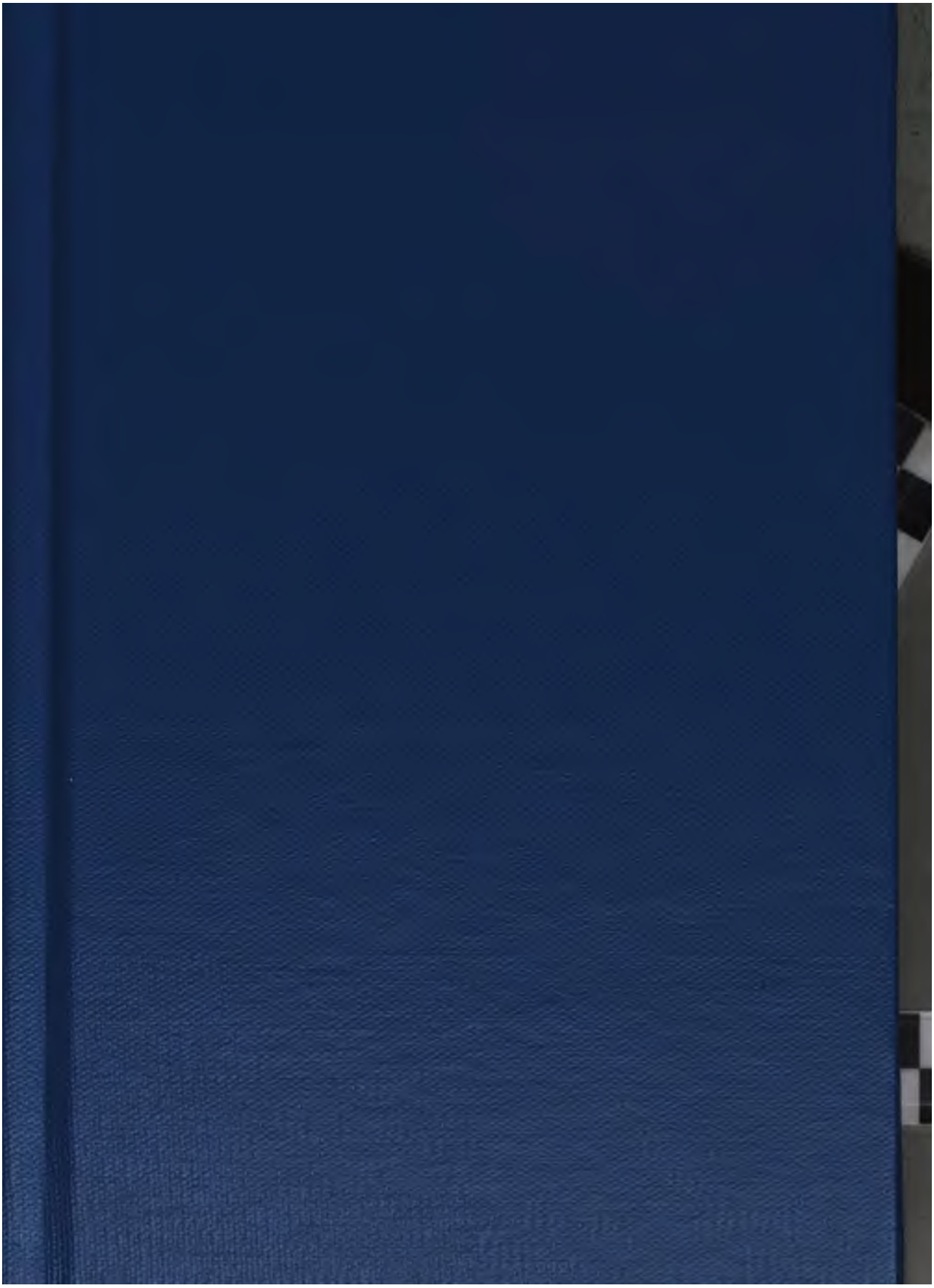

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MAKING A CART AND FURNITURE FOR THE KINDERGARTEN DOLL

EXPERIMENTAL STUDIES IN KINDERGARTEN THEORY AND PRACTICE

Edited by
PATTY SMITH HILL
Director of Department of Kindergarten Education
Teachers College, Columbia University

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TEACHERS COLLEGE RECORD

VOL. XV JANUARY, 1914 No. 1

INTRODUCTION

Teachers College, Columbia University, was, so far as I know, the first institution of higher learning to incorporate the kindergarten as the foundation of its educational system. This early recognition of the kindergarten as an organic part of education may be attributed to several causes. In the first place it may be traced to the sympathetic insight of President Butler, who was one of the first professors of education to realize the educational possibilities in the philosophy and practice of the kindergarten. In addition to this, no small credit should be given to the two remarkable women who were, in turn, directors of the Department of Kindergarten Education in its early history; first to Miss Angeline Brooks its founder, who celebrated with us her silver anniversary at our reunion in February, 1913; and to Miss Mary D. Runyan, who succeeded Miss Brooks, setting a stamp of culture which has been our birthright, and a standard which it has been our privilege to strive to maintain since her untimely death in 1905.

It has been a severe bit of discipline, and at the same time a rare privilege, to direct or teach in a kindergarten training school organically related to a large university where every department is manned with instructors holding varied points of view, and where each view must stand or fall on the values which can survive criticism, research, and investigation. It has been said that in modern life no movement commands respect

requires persistent experimental attempts to discover ways and means organically related to the end desired. The self-effort of the children is marked, and their attention unwavering. It might be described as the attitude and processes of creative work permeated with the spirit of play.

In this way the child's introduction to industry corresponds with that of the race, in that he is learning to produce through his own efforts the objects which promote the welfare of his social life. The dolls and doll families are of inestimable value as the children voluntarily centre their productions around the needs of the doll families and communities. The needs of the dolls while "make believe" from our adult point of view, are to the children almost identical with those in real life—food clothing, shelter, etc.; and the ways and means of supplying these in play-life offer the same motives and opportunities for creative work which they inspired under the grim and more pressing conditions in the race. The children became so absorbed in the reality of this motive that they voluntarily planned a series of occupations for themselves, not only for the day, but in some cases, for a week in advance.

At other times their own out-of-door play necessities have furnished the motive for the production of marbles, tops, kites, wagons, etc. Or, again, some real need in the kindergarten or the home has suggested the type of production; for example making crude little work aprons to protect their clothes when modelling, painting, or when washing the kindergarten dishes.

In occupations of this nature, the teacher's problem is in guiding the children's productions through an ascending scale of difficulty which will insure continuous progress in technique or control over materials. While kindergartners of an early day were enslaved by a narrow conception and scheme of sequence which was utterly foreign to the nature of the child and to life, the ideal is an important one, and may easily be overlooked or undervalued. If a teacher recognizes the importance of a continuous advance in the mastery of technique and materials, she will find that if the children are thrown upon their own resources in discovering solutions for themselves they will probably produce a fairly good attempt, representing their maximum skill; or they

become conscious of their need for guidance or suggestion which offers her the opportunity for leading them to better ways and means, or to a more adequate form of expression.

These points have been kept in the foreground of our consciousness through one and all of the experiments, namely: that *there must be freedom somewhere*—ample room left for choices, and provisions made for the child to make his own judgments and decisions. For example, if the child initiates the "what" of his production, the teacher's part may be to hold herself in readiness to offer suggestions as to the "how," the best ways and means; or, if the teacher has suggested the problem, aim or end, she must throw the children on their own resources to discover ways of arriving at the end. It has often been quite evident that when the children are intelligent as to what end they are striving to accomplish, they are set free from any undue dependence on the teacher for either dictation or detail of direction. The problem to be solved, the end to be attained, dominates them, and the teacher falls into the background.

In 1905 an experimental kindergarten was opened in Speyer School in connection with the new branch of the Kindergarten Department—Kindergarten Supervision. Dr. John Angus MacVannel was then acting as head of the Department and two distinct lines of experiment were set in motion, the results of which are given in the articles in this number. With the exception of the opening article, which is a stenographic report of an address given by Dr. John Dewey to the Kindergarten Department at the Reunion last February, all of the articles in this number are the results of experiments made in the Department since 1905.

The article by Miss Julia Abbot was presented before the training teachers of the International Kindergarten Union. It was the result of a theory which Dr. MacVannel worked upon, and those coöperating in the experiment under his direction were Miss Grace Fulmer, Miss Kate McMahon, Miss Louise Sutherland, and Miss Julia Abbot, then in the Horace Mann Kindergarten. The papers by Miss Luella A. Palmer are largely the result of her three years' experimental work in the kindergarten

connected with the Speyer School, which served as a laboratory for the new branch established by Dean Russell for advanced students in kindergarten supervision. These papers have been presented by Miss Palmer before the International Kindergarten Union at its different meetings. The paper by Miss Grace L. Brown is the result of experimental work with both teachers and children in an effort to find both the type of occupations and the method of presentation which supply the best transition from play to free, creative work. Miss Charlotte Garrison, director of the Horace Mann Kindergarten, has coöperated with Miss Brown in the work with both teachers and children, and the students in kindergarten supervision have had the opportunity of watching the experiments of these instructors with the children in the Horace Mann Kindergarten.

It seemed a fitting thing to ask Dr. Dewey to present the opening article in this volume, as much of the work here presented, especially the articles by Miss Palmer, Miss Brown and Miss Smith, was inspired by study with him, and by the results of his study of the kindergarten in coöperation with Miss Anna E. Bryan in the kindergarten in the Experimental School affiliated with the University of Chicago. An account of the results of this experiment came out in the Kindergarten number of the *Elementary School Record* in 1900.

The Kindergarten Department of Teachers College was not only at liberty to study the kindergarten problem from the standpoint of experiment and investigation, but was under the necessity to do so, if the kindergarten was to be placed on the same basis as all other departments. While Froebel's materials and methods have been respectfully studied to find the best in them, the materials used have not been limited to these or in any way bound by them. Careful studies and experiments have been made with a variety of educational materials, including not only those of Froebel and Montessori, but any good toys and play materials, including those from nature and those of recognized merit in the field of the fine and industrial arts. The results of these experiments have been compared, and those materials selected, irrespective of tradition, which have proved of greatest worth.

Free use has been made of the doll and doll families as they seem to furnish one of the most natural motives to work and play with materials. In the simplest sense of the word the doll is the symbol of humanity, and as man and man's needs, aesthetic, domestic, and industrial have been the incentive to all good production in the domestic, fine, and industrial arts in society past and present, so the dolls which represent humanity in the play life of the child, have proved to be a most natural incentive to production. It seems strange that the doll has been so largely overlooked or undervalued in the kindergarten, when its necessity and importance in the play life in the home is as old as childhood and motherhood. Froebel, who was the first to see the educational value in other toys of universal significance—such as balls and blocks,—at one time seemed on the eve of recognizing the doll in his scheme of play materials. However, his own personal absorption in geometry and mathematical relations crowded it into the background, so that instead of being central in the play materials in the kindergarten, it has been an adjunct, an afterthought, or an occasional visitor. In one place, he seems to see the doll as the symbol of humanity in childlife, as he poetically refers to it as a "play child." Fortunately, it is not only a play child, but it is equally effective as a play mother, a play father, a play baby, symbolizing in turn all members of the human family.

It is interesting from the historical point of view to trace the first emphasis upon the educational value of the doll and other good toys, such as doll carriages, furniture, dishes, etc., to Frau Henrietta Schräder, who was not only trained by Froebel, but his grandniece. The younger children, especially, had daily use of these in her kindergarten, the Pestalozzi-Froebel Haus in Berlin, where they were recognized as educational material as far back as 1880, if not earlier. Miss Smith, in her paper, presents some of the educational uses of the doll family and the doll community with their social needs. Dr. Dewey's presentation of the conditions and processes of reasoning in his book "How we Think" has been of inestimable service in helping us to demonstrate the fact that children reason very much as adults, provided they have the conditions which provoke reason.

We have introduced some blocks, which are much larger than those of Froebel or Montessori, for use on the floor and in group work. These are related as far as being based upon a unit of measurement is considered. They provide boards—a long-felt need in the constructive materials of the kindergarten, with which the children can construct bridges, floors, and houses sufficiently large for the children to get in and play "Lady-come-to-see" or store to their heart's content.

It is sincerely believed that the time has come when all materials and methods must be carefully investigated and those selected which prove to be of actual worth in the development of the kindergarten child, whether they be those planned by Froebel, Montessori, or their followers, many of whom are striving to hold fast to that which is good, while pressing forward in the endless quest for the better—the best—the ideal.

PATTY SMITH HILL,

Director of Department of Kindergarten Education.

REASONING IN EARLY CHILDHOOD[1]

John Dewey
Professor of Philosophy, Columbia University

When I seriously began to give my mind to the subject that was selected for me, I found nothing very special to say about the reasoning of early childhood. There is not any reasoning of early childhood which is different from the reasoning of later childhood, adolescence, or adults. There is reasoning in little children just as there may be in a grown up man or woman, but there is not reasoning of early childhood if you mean by that "of," something which as reasoning can be marked off definitely from reasoning somewhere else.

I have come to believe that reasoning itself, the capacity or ability to reason (or that bundle of minor abilities of which reasoning consists), is not capable of being improved with growing years, or, at least, its improvement is not sufficiently marked to be worth mentioning. Professor James in his Psychology, speaks in this way about organic memory—"the power to retain." Later investigations have led to some modification of his statement, but it is generally admitted that the power to improve radical or fundamental memory is slight. Unfortunately, however, the converse statement is not true. Retrogression is entirely possible, with both memory and reasoning. There is something for educators to do even if they cannot fundamentally improve the power of reasoning; their task is to furnish conditions so that this power can be kept together without a falling off of its pristine capacity. This is not a merely negative task although it is here stated in negative terms. The problem is to prevent the falling off or going backward, but accomplishing this prevention requires a great deal of positive activity in keeping the ability up to concert pitch.

[1] Stenographic report of paper presented before the Department of Kindergarten Education, Teachers College Alumni Conference, February 21, 1913.

Since the power of reasoning in little children does not differ fundamentally from that of adults, if we want to understand it in children we must study it in ourselves. There are of course differences in the concrete thoughts of children and adults, and these are differences in subject matter. These reduce to two heads, covering a variety of detail:

(1) There are different objects to think about, and different purposes for which to think, because children and grown-ups have different kinds of acts to perform—different lines of occupation, in short. The adult has obviously more complicated activities to carry on; he has concerns that continue over longer stretches of time so that more details enter in, and results are postponed. Hence he must be continually looking far ahead. The *process* of thinking is essentially the same for little children; but there is such a difference in the materials with which the thinking is done, and the ends or objects for the sake of which is carried on, that the impression is easily created that the thinking itself is of a radically different order.

(2) There is another difference between children and adults. The objects and ends of adults, because long continued, have a definitely established character, have a more specialized organization. The absence of a high degree of specialization in vocation and in particular duties among children, gives opportunity for a freer and more flexible play, a greater open-mindedness and greater susceptibility to new ideas than the average adult succeeds in retaining.

The process of thinking has been often explained. There are just three elements or constant conditions. (1) The end to be reached. (2) The selection of the means by which to arrive at it. (3) The possibility of new discoveries in working toward the end.

(1) If there is an end ahead to be reached there must be a forward movement, a certain span of time between the person and the object to be attained. It is significant that all of the words like "attaining" and "achieving" have the idea of a forward movement, and imply a certain distance between ourselves and something a little way ahead of us in time.

(2) For the sake of the something ahead that we want to

attain there must be a selecting and arranging of various means and materials which will enable us to reach that end. These words "selecting" and "arranging" have a mechanical sound. If we had a box of cut-up pieces of wood and all we had to do was to pick out some of these and put them together, the operation would be mechanical; but in thinking, this selecting and arranging are done for the sake of reaching an end—something ahead of us, something which we have not but are trying to get. Hence they cannot be of such a mechanical character as the words indicate. In other words, this selecting and arranging always involve something of *experiment,* relative to an element of uncertainty, and (what is more important) to the need and possibility of discovery.

(3) The selecting and arranging of means and materials, if there is an end ahead, is by the very nature of the case a tentative process, as much a process of experiment and discovery as the operations of a scientific man in his laboratory. It might appear to any one who entered a chemist's laboratory that he selected a pinch of this and a pinch of that and mixed them together much as a cook in the kitchen selects salt, and milk, and flour and beats them together. The latter may be a routine act, but where there is thinking, or intellectual experimenting, there is something new, something really distinct in the end to be reached, different from any prior experience. Unless there is something in some degree novel in the purpose or end, then there is no thinking, only a performance of a routine act, following a formula which has been given so that there shall be no possibility of doing the wrong thing. Only when the end to be reached is something ahead instead of something behind, something still to be done instead of something which has been accomplished, the selections and arrangements have intellectual quality. They represent an experiment of the mind and of the imagination. The zest and joy of discovery cling to them.

The ends which a young child has are different from those of the grown-up and the materials, means and habits which he is able to fall back upon are different, but the process—one involving these three factors—*is exactly the same.*

There is a difference in the psychological context which needs

to be mentioned because it is so important practically. Just because the child's ends are not so complex and not so remote in the future, the tendency to put every idea in immediate action is stronger with the child. His dramatic instinct or his play impulse is markedly more active, more urgent and intense. This creates the appearance of a great difference in the quality of the thinking itself, but it is a difference in the psychological landscape, as it were, rather than a difference in the actual process of thinking itself. The child's end is not far ahead and so the immediately physical and motor character of the selecting and arranging comes out more markedly. The physical elements and the tendency to adapt them to immediate use are present in grown people, but are disguised and translated by substitutes. Adults use words and other symbols as the media for selection and arrangement, but words are not dramatic enough for the thinking of the child in a great many situations. He wants to reach his end with his whole body instead of doing it with the muscles of the throat and tongue alone. Adults carry on a constant physical activity of a suppressed kind; to get a remote and far-reaching end, they employ minute and invisible kinds of expression. A child wants to bring into play in an active and overt way his hands and arms and legs.

While native rational power can hardly be improved to any great extent, if at all, it can easily be allowed to decrease. A child can be surrounded with conditions which cause the power to be dissipated and rendered ineffective. If a child is bright, the power can be drafted off in all kinds of futile and irrelevant ways which result in mind-wandering, inability to control the attention or center the mind on a topic around which the selecting and arranging of materials are to be carried on.

This dissipation may take place in three ways. (1) Plain frittering away of time. It is called frittering away of time or wasting time, but this is merely another phrase for fooling away intellectual energy. This comes from not having any purpose in view. "Amusing" in the worst sense of amusing, means that there is no *recreative* element, but only dissipation of energy. It is not enough to *catch* a child's attention; it must be *used*, and this implies an end. The mind should be carried on to some-

thing new. A lesson may be beautifully planned and given, but if the child does not get intellectually something he did not have before, he is frittering away his time. He may be wasting his mental capacity when he is doing things which seem to the teacher to be very important. Merely to manipulate materials may have no meaning to the child. The *teacher* may be getting some intellectual exercise, may be arriving somewhere or thinking, but unless there is an end in the child's own experience, then *for him* it is a case of frittering. To manipulate purely symbolic material of some sublime mathematical or spiritual truth, unless the child has some equivalent counterpart, is thus a case of frittering away energy. (2) Another thing which makes for retrogression is the amount of purely dictated work that the individual has to do. The measure of thinking in a child or adult is not in the repetition of the past, but in seeking for a future, not in following the old, but in reaching out for the new. Dictated work alone eliminates the attitude of searching, of reaching out, experimenting. Undoubtedly the best way to train animals, horses and dogs, to do their stunts is to assign a specific thing to be done, dictate it and give a reward when that particular thing is accomplished—and something else when it is not done. Children are animals too. It may be that physical habits are most readily formed by a process which is largely dictation; but it must be borne in mind that in the latter case, while the physical habit will have intellectual meaning to us, to the child it will be senseless, and hence his mental capacity may be reduced.

(3) The third thing which has a detrimental effect upon the child is presenting ready-made, finished formulae upon the basis of which he is to act. Since there should be reaching out for something new, the process of selecting and arranging materials should be more or less experimental and tentative, a process of trying this or that to see how it will work, then retaining the things that carry toward the end and dropping the other things. This process requires some spontaneity and leeway; and too definite and finished formulae are hostile to this freedom of personal experimentation. Conscientious teachers are prone perhaps to fail *here* more than at any other point. They want to

forestall all failures. They want to dig the little plant up by the roots to see that the roots are growing and growing in the right direction. It is quite safe to say that no two grown persons get the same result by the same method unless the situation is an exceedingly simple one. Sometime after you have had a complicated question on your mind, if you will ask yourself just how you reached a result, and go back and try to recall every step you took and misstep also, and then compare it with any formula that can be devised, you will see the difference between the consciously formulated method and the method unconsciously but vitally used. What is called thinking is very largely a series of intuitions. Something comes into the head—it sprouts. It does not come by any formula which was there before. We say "I think," but "I" do not, *it* thinks. There is something which is deeper than our *conscious* rule.

The orderly method is good but it comes as a *result* (often comparatively late). What might seem to a grown-up person to be disorder might seem to a child's mind, order, in the way he selects and arranges things. The mere fact that a certain order of thinking does not fall into the teacher's schedule of thinking means that a child is one person and the teacher another. Yet we imagine that there is just one right way to think and if another person does not get results in the same way that we do, we conclude that there is something wrong.

Perhaps the most difficult thing to get is intellectual sympathy and intellectual insight that will enable one to provide the conditions for another person's thinking and yet allow that other person to do his thinking in his own way and not according to some scheme which we have prepared in advance. This applies quite as much to the teaching of the elementary school subjects, such as arithmetic and grammar, as to the reflections of the adult discoverer. At present we often think that a child has no right to solve a problem or do a sum at all unless he goes through a certain form.

There is one point which has not been touched—the question of the materials appropriate for the thinking of young children. This matter cannot be easily anticipated or cleared up in advance of actual contact with actual children. But we may ask what

WASHING THE DOLL'S CLOTHES

ends occupy the attention of most children. They will be found to fall under two heads—(1) The very small child has as his chief end the adjusting of one of his physical organs to another. He has to learn what the lower animals have to start with. He has to work out by practical experimentation how to make his hand and eye work together, his ear and eyes work together, how to manage and manipulate physical materials by means of his own organs. Intellectual thinking accompanies this process of experimenting with physical activities so as to reach certain results. There is the question of an end to be reached, and this is cleared up by managing, manipulating, coördinating the operations of the senses and muscles. Here we have one of the great reasons, on the physiological side, for the success of the kindergarten movement. In various ways (whatever reasons may have been given for the process) it has secured a large opportunity for direct muscular adjusting, and for manipulation of various kinds of objects. If the young child has an end which he wants to reach and has sufficient freedom in choice and arrangement of materials *to work out for himself the end he is after,* there is sure to be a genuine keeping going of the thinking process.

(2) The other great problem for a little child is to get along with other people. He has the definite occupation of adjusting his conduct, in a real give and take of intercourse to that of others. He needs to make other people realities to himself, while he gets the power to make himself real to them. There is an adjustment of behavior which includes a good deal more than that of outward or muscular acts. The questions arising from the groupings of persons are the most perplexing problems of life even for grown up people; but for the children, the problem is especially acute owing to their dependence upon others and their inability to make their way physically and industrially.

Material selected then from situations of physical control and social adaptation (especially from the two in connection with one another) is most appropriate for the work of the teacher in maintaining the mental acuteness, flexibility, and open-mindedness, the dominant interest in the new and in reaching ahead that are at once such marked traits of the life of childhood and such essential factors of thinking.

THE DEVELOPMENT OF REASONING IN YOUNG CHILDREN

Meredith Smith

Instructor in Teachers College and Horace Mann Kindergarten

[This article was the discussion of an address given by Dr. Dewey before the Department of Kindergarten Education at the Teachers College Alumni Conference for 1913.]

Problems in education have been concerned largely with the effort to devise means or methods by which children might be led to acquire a greater amount of knowledge and acquire it with greater ease and facility. The problem of to-day is rather how to provide conditions which will call out the greatest amount of initiative in children, which will most effectively develop reflective thought or reasoning.

This problem is a general one which should interest teachers of children of all ages although each will be especially concerned with that form of practice which seems to offer best opportunity for the development of reasoning in the particular children with whom he is dealing. The aim of this discussion is to treat the subject from the standpoint of the education of young children, those of so-called kindergarten and primary age. Before discussing any specific application, however, let us first consider the nature of the problem itself. How may reasoning be developed in children or what are the conditions essential to its growth?

Dr. Dewey has analyzed the process of reflective thinking in his "How We Think" and has there stated the conditions upon which its development depends. He says that the first essential in the reasoning process is that the individual have some end or aim in view,—an aim whose realization presents perplexities or difficulties, in other words, a problem to be solved.

At first glance this may seem to be a process somewhat remote from what might be expected of young children. But observation shows us that even an infant has problems of his own.

He desires to recover the ball that has slipped from his hand and rolled out of reach, and though to us its recovery would be so simple a matter that the word problem seems out of place in relation to it, yet to him that recovery is a matter of no small difficulty.

If reasoning, then, is a process that begins in infancy and one which every individual has daily and hourly need of performing, must we not assume that its development is one of the prime factors in the earlier periods of education?

In the traditional kindergarten and in the primary school other ends have taken precedence over that of the development of reasoning. Progressive kindergartners have perhaps taken the greater interest in work that demands initiative on the part of children.

In this paper some inferences may be drawn from several experiments that have been made with children in the Horace Mann kindergarten where the gift and occupation work was presented so as to involve simple, childlike problems, perplexities, or difficulties which demanded thinking in working out a solution. Some of the experiments are as follows:

(1) The problem was to make a chair or table, to build a house or bridge from a certain given material; that is, an end was set and the children worked out the means by experimenting with blocks, paper, sand, cloth or other material until they got a satisfactory result. (2) Again an end was set, but there were certain limitations, or certain units given; for example, an open window made of sixth gift bricks and a house made so as to include one or more of this given arrangement of blocks. (3) A model was presented—a barn made and shown—and the problem was to reproduce it. Often one child's work became the model for imitation. (4) The problem involved the selection of material to be used in making some object, such as a broom or a seed bag, or in building a house or a fence.

There was an interest for children as well as a value in this form of play, which prescribed or dictated work cannot have. The number of very good ways of making things that children discover is surprising and the variety of forms adds greatly to

the interest. Children get suggestions from each other's work of further possibilities which they may carry out.

Excellent as this work is, when we come to study deeper into what is involved in the development of reasoning, we find that several of the factors that seem essential to good thinking are lacking. In the first place, the problems are somewhat artificial, that is, they are largely suggested by the teacher. *There is no situation out of which needs naturally arise as they do in life* and become to children ends and purposes which they make their own and which challenge them to overcome difficulties or perplexities in order to attain them.

But we may ask what is the nature of a situation out of which needs would arise and how may we create such a situation in a schoolroom? As we observe children in their spontaneous play we find that dolls and other toys suggest a social or life situation and that in relation to them there are needs to be satisfied. Given dolls, children feel the need of clothes, of houses, of furniture, wagons, trains, stations, and so forth.

In play in a kindergarten such needs would continually arise as children's ideas developed under guidance and their technique improved. Primary children in the execution of their aims or purposes would demand more detailed and exact representations which would include reproductions of more complex phases of social life and of the processes necessary to its perpetuation. Under such conditions reading, writing, and arithmetic would become the necessary means by which these ends could be more adequately realized and they would not be looked upon by children as just school studies that seemed to have little or no relation to use in life.

To children, dolls stand for human beings, so that in constructive work for them, children are carrying out play purposes which aim to satisfy human need. The achievements of modern civilization are the result of a similar effort in the race. Mankind may be said to have developed intelligence or reasoning power through the attempt to satisfy ever more adequately human needs and desires. When we provide children with conditions for play of this character we are giving them an opportunity to develop in a way analogous to that through which the

race attained its development. We are giving them real experiences, permitting them to discover their own ends and work out the means for attaining them.

The criticism has been made regarding the subject matter of school studies that it represents material that has been abstracted from experience, logically arranged, organized from an adult point of view and presented ready-made to children. The same criticism may be made of the practice in the traditional kindergarten. Though here such things as chairs, tables, houses, bridges, and so forth, have been abstracted from social life where they have meaning and significance, and have been arranged by an adult mind in the form of sequences to be given to children by dictation. The method of presenting work as a problem is a significant step in advance, yet here do we not still have the object generally isolated from social life or need? Though the bridge is worked out by the children themselves it does not come to them as a necessity in a situation, and is not used in any way when completed. Its construction is presented merely as a end in itself.

An effort has been made to give purpose to children's work by relating it to the needs of the one kindergarten doll. Each child makes the desired object, but the work of only one child is kept for the doll while the rest take theirs home. There is here an idea of purpose and need yet the work of only one child fulfills the need.

In this article no reference is made to that form of play where children are merely handling objects, when they are experimenting with materials, finding out their possibilities. The value of this is taken for granted at that stage of development when it is needed.

In the first place, then, the problems here considered do not represent the maximum amount of thinking because the ends or purposes are not real purposes in the sense that they originate from the children themselves, and they do not appear as needs in a social situation.

In the second place, problems related to the construction of isolated objects often fail because there is no evident means for testing the result when it is attained. Dr. Dewey says the im-

portant thing is that every inference or suggestion of a possible solution shall be a tested inference. As the problem of constructing these objects does not arise from any felt need for a solution, the purpose in construction must necessarily be merely to reproduce, on a small scale, objects of adult use in so far as the material and experience of the children will permit. The aim is to make a chair or table, or to build a bridge that will resemble these objects that in social life meet a need. But how may it be determined whether the results are good representations or not? At least it can be only a matter of opinion or of the authority of the teacher.

An essential feature in training children in reflective thinking is, as Dr. Dewey says, the cultivation of habits of discrimination between results that are tested and those that rest on mere assertion or opinion. In relation to such materials as dolls, doll houses and toy animals where activity is guided by a purpose the test is, as it is in life,—*does the result serve the purpose?* Some years ago in Louisville, Kentucky, Professor Patty S. Hill, now director of this department, began this type of experiment with dolls, but frequently one doll only was available, as a means of testing the children's work. Now we would ask that each child have a doll of his own so that in a more adequate sense he may initiate his own purposes or ends and test his results.

Another essential point in this training is the development of habits of suspended judgment. While suggestions or results are not necessarily immediately accepted where we have construction of the isolated object, it is nevertheless true, I believe, that suggestions will be more carefully weighed if the result must stand the test of use; judgment of it, at least, must be suspended until the test has been made.

It may be truly said that a little child makes no distinction between means and ends as he plays. However, even though he is not conscious of the distinction, he is laying the foundation of habits of thought and action so that the form of his early play has as much influence in his development as what later is called work where there is a clear consciousness of means as the process through which ends are attained.

We may perhaps clear up the whole problem by examining

a few practical illustrations which seem to introduce the conditions that develop reflective thinking. Let us imagine the dolls as having moved to the country and the children, as farmers, having shelled some real corn and threshed some wheat. The problem naturally arises, what shall they do with it until they are ready to take it to the mill to be ground? Each must build a bin in which to store it. The result of his work will be proved when he pours in his corn and wheat. Did he make it large enough and strong enough? Did he provide for keeping the corn and wheat separated?

Where we have the building of a bin presented as an isolated problem without some way of testing there is no means of judging the value of results. We can resort only to opinion or authority. The teacher may explain that one with a partition would keep the corn and wheat from mixing and that it would take less room and fewer blocks than two. But even if children could realize the fact, without the experiment in testing—which is doubtful,—the process of reasoning is not complete.

To the children who have a social situation before them, other problems are arising—the construction of a mill, the making of bags of some kind to hold the real flour and meal which goes back in the farmers' wagons in place of the wheat and corn. If the mill is on the other side of a river, chalked on the floor, there is a new difficulty—a bridge must be built.

Contrast the problem of bridge building in this situation with that where the teacher presents the problem of building bridges with certain material on the tables without any relation to a social situation out of which it might arise. The children have a purpose which is their own and the result of their work is judged, tested by its adaptation to this purpose, not by its resemblance to a general idea of what a bridge used in adult life might be, a vague and indefinite thing, but by the fact that children could get their wagons from one side of the river to the other by means of it. With the large floor blocks used in the Horace Mann kindergarten the bridge may be built large enough and strong enough for the children to walk over drawing their wagons or carrying their dolls.

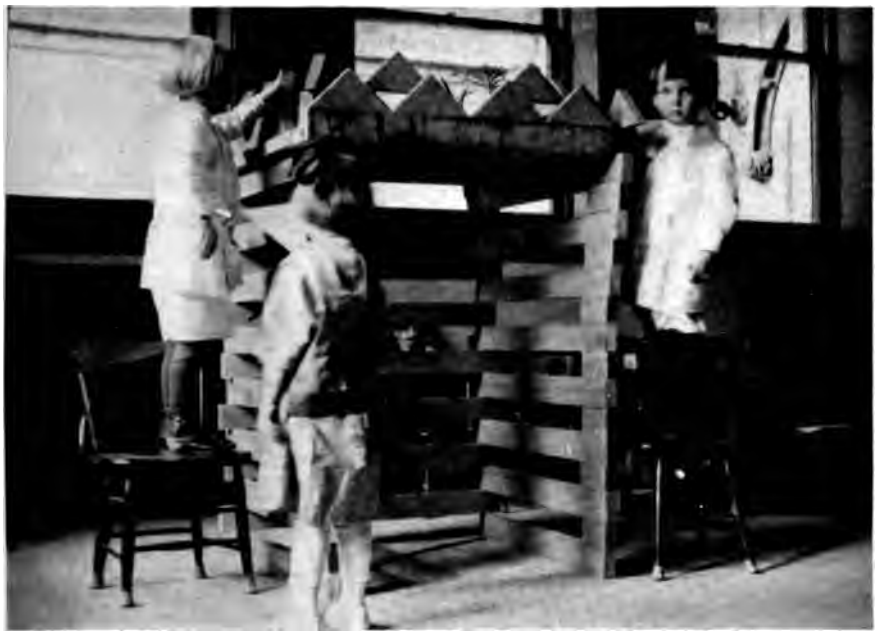
Toy farm animals offer suggestions of wonderful play possi-

bilities. The possession of a toy cow creates in the play world needs and responsibilities much as it does in life. Barns must be built, fences constructed and bottles of milk (cylindrical heads) carried from the country to those who live in the city and cannot have cows of their own.

If there are sheep they must be cared for. The wool prepared for shipping, freight cars built to carry it in and wagons made to haul the wool from the cars to the factory. The factory takes in wool and turns out cloth to make the dolls' clothes, just as corn and wheat go into the mill and meal and flour are given out. This is as much of the experience as kindergarten children will understand. Primary children would work it out more in detail and gain an understanding of the process, the primitive process, by which wool is made into cloth or corn ground to make meal.

Some interesting results have been gained in certain primary grades where the work has been made to center about primitive industries. But here the same criticism might be made, that they are treated as ends in themselves. Older children would be interested in the life of the people and the stages of their development in relation to their expanding industries, but this seems too remote from the interests of children of six or seven years. In play of the character we have been discussing, primitive industries would become the means by which children could more completely realize their own ends.

Another need which is sure to arise at some time, creating a new aspect of social life, is that of stores of different kinds. When actual things are to be put in and sold—colored beads large and small for vegetables in the grocery store, clay bread, cakes, etc., in the bakery, real cloth, ribbons, patterns and thread for making dolls' clothes in the dry goods store—children build with a purpose and end in view. They construct counters and shelves, not merely because stores they have seen are supplied with these things; they build them for the same reason that in adult life they were primarily built—to display and store goods and provisions. When complete, the store is tested by its general usefulness and convenience to customers. Here we have children prompted to action by the same motives and needs (real



BUILDING WITH LARGE FLOOR BLOCKS—PLAYHOUSE

PLAYING IN HOUSE MADE OF LARGE FLOOR BLOCKS

for the time) in the same sort of situations that prompted the race towards its development. With Professor Hill's floor blocks children may build their stores large enough for one to stand behind the counter and others to come in and buy.

In relation to a discussion of reasoning in children it may be interesting to make some comparisons with the Montessori materials and their use. Dr. Montessori claims for her didactic material that it is self-corrective. But in life the correction of activity does not lie in the nature of the material as such, but in whether you accomplish your purpose with it. In testing a project that aims to meet a social need, it is equally self-evident whether you have succeeded in securing a satisfactory result. But here the child's judgment is called into play to make the decision and we have what corresponds more nearly to conditions in life.

There is a valuable suggestion for us in the spirit of freedom which it is claimed prevails in the Montessori schools, in the liberty given the children to select the material that they wish to work with. But where we allow the same freedom of choice of material, as is demanded in this socialized play, we find this radical difference: in the Montessori schools there is nothing to guide children in the selection of materials save their own present inclination, whereas in the face of a problem motive guides the choice. In the latter case selection is made after reflection of a kind that is fundamental in life and is itself the solution of a problem tested by the adaptation of the material chosen to the purpose for which it was taken.

As this form of play has as much influence in the physical and moral training of children as it has on their mental development, this discussion would be incomplete without some mention of these aspects. We all acknowledge that it is not right from the physical standpoint that a child with his growing, active, restless body should be kept seated for the length of time demanded in the majority of our schools, especially as desks and also kindergarten chairs are too frequently unsuited to their stature. It is free play on the floor, or at the table, as occasion for each child demands, with continual change of position, lifting and carrying things from one place to another, that affords

the most natural, healthful activity for young children, provided, of course, that the floors are clean and free from draughts.

In the race, moral conceptions have grown out of human association and relationship. Because we have eliminated from our schools the only condition that would give opportunity for a natural moral training—that of free social intercourse—we have had to resort to the unpsychological method of attempting to develop the child's moral nature by the introduction of another subject of study—the study of ethics. Where children are freely playing and working together, where they are sharing with each other, coöperating and assisting each other, we have opportunity for the only kind of moral training that is really effective.

In play with dolls we have another phase of ethical influence. One example may perhaps make this more clear. At one time when a group of kindergarten children were playing with their dolls a number of them laid the dresses just taken off on the floor. After some remark about teaching children to take care of their clothes I noticed a child quickly pick up his doll's dress and say to himself, "I'm not going to teach my little girl to throw her things on the floor." The interesting thing about it was that teaching his little girl meant doing it himself, for it did not seem to occur to him to make any pretense of playing the doll was picking them up.

The finer traits of character in the race have developed in home and family relationships, through a feeling of responsibility for the care and proper training of another, a weaker and more undeveloped human life. And though to the child in play this other is only a doll he is nevertheless developing his character in his relationship to it. He is forming in himself right habits and attitudes, not just for the sake of developing right habits or to meet his parents' or teacher's demands, or simply to gain their approval. His motive is that he may, by certain conduct of his own, care for and help to hold another up to what he recognizes as the social ideal. In a subtle play way he is overcoming his own personal inclination for the sake of another's good.

To some this may seem too fine a point, but is it not true,

though this is what *we* would call play, that there is a strong element of reality in it to children? In such absorbing occupation they are really living. Dolls are to them other people. And if it be true that children become like what they imitate, we must believe that character will be influenced and modified for the better in this reproduction of human life through play.

Work of this character will mean a very radical change in kindergarten and primary grades. Yet if we would provide for children the conditions now being recognized as essential to their fullest growth and development, if we would allow them the inalienable right of every human being, the right to develop his own individuality, under guidance to be sure, a very radical change is necessary. It is the recognition of the fact that power to reason is greater than ability to retain knowledge, that absorption in what one is doing is of more value than ability to hold to a task under compulsion, that is, pointing out the direction that reform will take.

THE PLAY MOTIVE AND EXPERIMENTAL METHOD IN KINDERGARTEN OCCUPATIONS

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It is the purpose of this article (1) to trace briefly the influences which have brought about the marked changes which we see in kindergarten occupations, (2) to present the viewpoint which has grown out of these influences, (3) to show the application of this viewpoint to the beginnings of industrial arts or occupations.

The principles here presented are equally valid in the beginnings of fine arts, but this article shows their application to the one type of occupations.

The term industrial arts or occupations is used not because the hand work of kindergarten and primary children can in any sense be classed as an industrial product, but because through these crude beginnings can be traced the early experiences in shaping materials to fit some individual idea or need, which make the finished product of later years possible. The crude pottery, weapons, and personal decorations of primitive people at first glance seem to have little relation to the arts of the present day, but we have the products of the ages which lie between to prove that the last could not be a reality without the first and all the intervening steps. This interpretation gives the entire field of hand work with children a broader and deeper significance and makes it possible for us to be very patient with the slowness of their progress and the crudeness of the product.

I

Probably the force which has been most constant and effective in bringing about changes in the occupations and other materials of the kindergarten is that furnished by genetic psychology and child study. Froebel has been called the father of child study, and in the sense that he gave the impetus to the

movement, and directed attention to the need of studying young children in order intelligently to guide them, the statement is true. But we should not look to the occupations or so-called "schools of work" of his followers for an illustration of Froebel's knowledge and comprehension of the nature and capacities of little children, for perhaps nowhere in his elaborate scheme of materials is there less fitness.

This incongruity was recognized years ago by many kindergarten teachers who were not highly trained scientifically, and the process of elimination and modification began long before the physician, the physiologist and the psychologist began their attacks. When these scientists did turn their attention to procedure in the education of little children, it was the occupations of the kindergarten which drew their first and most severe criticisms. The close application and fine muscular coöordination required by such occupations as pricking, fine card sewing, fine weaving and intricate folding were shown to be most harmful. These hygienic considerations resulted in a further modification, elimination and substitution.

As the connection between the kindergarten and the elementary school became closer and more universal, each department responded in some measure to the influence of the other. Examples of this reaction in the kindergarten are,—the criticism of the occupations by art teachers, from the standpoint of form, color and technique, resulting in a number of needed changes such as the use of better color; and the influence of manual training resulting in the introduction of built-up or constructive occupations.

Together, the kindergarten and the elementary school have moved away from a logical order of developing subject matter and materials, toward a psychological order. This tendency shows itself in the kindergarten in a departure from the old idea of sequence in material which was without meaning and purpose to the child, to the conception of a sequence of expanding and developing ideas and purposes, the material being merely a medium through which thought is expressed as is language. Closely related to this is the present tendency to emphasize the importance of motive in all school activities. A

genuine childish purpose not only gives impetus to any given effort, but also is a factor in its guidance and control. This has led to the elimination of such occupations as card sewing, paper weaving and sequences of folding and cutting, as not providing sufficient motive, and the substitution of other materials and projects which seem better to meet the needs of the children.

II

Value of Manual Expression. It is the instinctive tendency of children to carry all impressions over into some form of motor expression. This is especially true at the kindergarten-primary age when hand work has an equal value with conversation and play as a means of expressing, organizing, and clarifying ideas. Material is at first a stimulus to thought, and then a means of expressing and clarifying thought, as is shown in the following illustration. An experimental fold or two of a piece of paper develops unconsciously into a form which suggests a boat; then according to the child's knowledge of boats, a smoke stack is added, or a sail. The idea grew out of a form which, though stumbled upon, resembled and called up images of a boat, and so stimulated the desire to make the boat more complete. In some such way as this there is a continuous interplay between expanding ideas, and more and more complete realization of them. The relation of conversation, play and materials is very intimate, and with proper encouragement the three will develop together and be mutually helpful to each other.

Materials. In selecting materials two qualifications are necessary, first, that they shall be sufficiently large to preclude in their use the possibility of muscular or nervous strain; and, second, that they shall possess reasonable adaptability in unskilled hands. The field of choice is larger than the traditions of the kindergarten have led us to think possible, and if we stop to consider what children use outside of school for this type of work, in the home and out-of-doors, it will give us a basis for selection. They try out anything which is at hand, but we most frequently find them using paper and paste, cardboard, boxes of all kinds, cloth, needle and thread, string, wood and nails. If the school employs similar materials and wisely

directs their use, valuable connections are set up between home life, play life, and school life.

Purpose or Motive. A child's use of materials is very soon characterized by some motive or purpose which may be the merest thread of spontaneous unrelated incidents, or a definite aim set by the demands of his play life or his simple social environment.

With the youngest children the mastery of the material is in itself a problem. As ideas grow out of the using, and in their turn suggest other uses, there is a growing definiteness which is the beginning of purpose. With the oldest children there is a definite need of motive, if interest and effort are to be sustained and carried forward to a higher plane. This motive, whether set up by the child himself or by the teacher, must be of real value in the child's eyes. "The child is interested in objects simply from the standpoint of the part they play in his life, their use, their function, their purpose or service."[1]

If we watch children of all ages in their undirected use of materials at home and out of doors, we find they are either experimenting, discovering what they can do with them, or working with a purpose, making something definite. A little child with hammer, nails and board is quite content to drive nails; but an older boy wants to see his material take form as the result of his effort, and makes a boat, cart or house.

We should not overlook the fact that children often express spontaneously through material an immediate or temporary interest aroused by something seen or heard, or by what someone else has done or suggested. The point of departure may be the weather, a ride on boat or trolley car, or the passing of a parade or fire engine. It is of just such fragmentary incidents that life experiences are built, so it is well to use them as they come up, but not emphasize out of proportion to their value.

Method. With little children method in the use of materials has to do with the question of how best to present them so as

[1] Dewey, Imagination and Expression. An address given before the Western Drawing Teachers' Association, a report of which was printed in *Kindergarten Magazine*, Sept., 1896.

to secure a growing intelligence and control in their use. The experimental method judiciously used seems most nearly to fulfil the requirements, as affording an opportunity for interaction between the child, the teacher, and the materials. It creates an attitude of open-mindedness to suggestion from all sources, and gives the best opportunity for individual expression, originality, and mastery of material. By the experimental method is meant the way in which man has always approached any new situation, reading its meaning from the superficial signs at first, and according to his own experiences, then trying it out and turning to every source at hand for new light, until he knows both its possibilities and significance, and can use the results to serve his needs.

Applied to the use of materials with children, the method begins with simple experimentation aided by spontaneous imitation, or suggestion, if needed. This gives an opportunity to become familiar with some of the possibilities and limitations of the material, and gives a feeling of independence and freedom, which is lost if the first uses are more restricted and formal. We should do all in our power to keep the little child's faith in his ability to do anything, to conquer worlds, for in that fearless state he gains much knowledge and skill, and acquires the invaluable habit of attacking each new problem unafraid. Later comes a period when he tends to lose this self-confidence.

When the stage is reached where a definite purpose has arisen, the skillful teacher gives a large amount of freedom and opportunity for choice and individuality in the details of the work. Experience has shown that children are capable of selecting problems which are well worth while, if they are encouraged to do so, and are confident that their suggestions will be treated with respect. This in the child can be readily understood by the adult, who knows so well the stimulating effect of opportunity combined with the faith of others in his ability. If the work in hand suggests to the children future possibilities for the use of a given material, or if some need arises in play or work which they think they can supply, teacher and children can talk the matter over for the purpose of selecting the best ideas, and the best means of carrying them out. In this way children will

BUILDING WITH LARGE FROEBELIAN MATERIAL. MOTIVE—NEEDS OF DOLLS AND ANIMALS

often plan a sequence of work far ahead, and with considerable detail. The teacher from her point of vantage as student of child and materials, may see many a possibility which would not suggest itself to the children. She may know a better process, a more suitable material, a more skillful way of handling the tools, but before making the suggestion let her ask herself the question—Will this appeal to the child as his own, and is it suited to his stage of development?

Technique. The technique of little children is, at its best, crude, and their work is characterized by lack of proportion. These defects are largely due (1) to a lack of muscular coördination, (2) limited or no knowledge of the possibilities of materials, (3) the incompleteness of their ideas, and (4) the degree of their interest in the doing rather than the product.

Little technical skill is acquired at first but the children are learning the fundamental inherent qualities peculiar to each material, which was also the first step with primitive people. Imitation plays a large part here as they are quick to gather suggestions from all sides, unconsciously selecting and adopting as their own other ways of doing. This is one of the reasons why it is a mistake for the teacher to plan the details of the work too carefully.

With the growth of more purposeful work comes the increasing realization of a need of better form, and such realization is best secured as in real life, by submitting the object made to the test of use. The marbles must be round and smooth to roll well, the marble bag must be sewed so as to leave no gaps, and the draw string must be secure and yet work freely. With experiences of this kind, technique and proportion begin to improve without special emphasis, because the worth of such standards is appreciated by children. Dr. Dewey says, "If one is thoroughly interested in the idea as something to be expressed he must on this account be interested in the mode of expression. An insufficient interest in the form or process always marks something crude, hazy or unreal in the grasp of the idea or content. We must be interested in the expression just in proportion to the intensity, the controlling character of our interest in the idea. But, on the other hand, this interest in

the idea, in the story to be told, the thought to be realized, is the only basis for an artistic interest in the technique. A mode of expression separated from something to express is empty and artificial; it is barren and benumbing."[2]

In a desire to *see* the children progress more rapidly, to get better, more artistic results, it is so easy to over-emphasize technique, and forget that "the product of a child's work is not an end in itself, but a means of growth." Professor Sargent says, "The shaping of easily handled material till manual expression becomes a matter of course is accomplished most satisfactorily when there is little criticism of results and when technical instruction is only incidental."[3]

The relation between the fine and the industrial arts is very close, for there is so much of real art feeling and expression in the way in which a project is carried out. There is the question of good proportion, and the selection of color and decoration, all factors in technique, and having their beginnings in the kindergarten.

III

At this period the play motive gives the greatest impetus to construction, whether it be merely the desire to play or experiment with material, or to make something which can be played with. The value of the product is, as a rule, temporary, but it meets a need, serves a purpose as nothing else can, and supplements the permanent plaything.

In the free use of all play materials children will make the same thing over and over, not repeating in exactly the same way, but with variations, added details, and increasing control. They also return again and again to the carrying out of a purpose which seems to them worth while. This suggests the value in directed work, of repetition at frequent or longer intervals, or where a series of projects makes up the whole, carrying it on from day to day while interest is at its height. In the use of all materials reasonable care and economy should be taught, but there should not be any limitation which would hamper the development of a legitimate purpose. The younger

[2] Dewey, Imagination and Expression.
[3] Sargent, Fine and Industrial Arts in Elementary Schools, p. 32.

children use less variety of material in their work, but there should be a generous supply of what is needed that they may have ample opportunity to experiment. The few tools required should be of the best, for how can unskilled hands gain control over them and over materials, if the implements are so poor as to be almost useless even in the hands of a skilled worker?

Clay. The use of clay tends naturally in two directions, toward fine art and toward industrial art, but only the latter will be considered here.

The first pinching off, rolling and patting by the younger children soon gives place to activity directed toward a purposeful end, by a suggestion from some child or the teacher. Loaves of bread, cookies and cakes will take form so rapidly that soon there will be an ample stock for several bakers' shops, and in the play which follows an unconscious emphasis will be put on characteristic form and originality. This particular play may be carried on for several lessons, or it may be superseded by a fruit and vegetable store, or the making of dishes for a tea party.

These same problems and others can be worked out by the older children but with a more definite purpose and greater attention to detail and artistic form. Sets of dishes can be made for the dolls, strings of beads for both dolls and children, small bowls to hold the seeds gathered, and marbles with the coming of spring. Of course, these things are breakable unless it is possible to have them fired, but that does not greatly lessen their value.

The interest in marbles is enhanced by painting them with water color paints after the clay has dried, and coating them with a thin covering of white shellac to give a gloss; and the beads (which are strung with a needle and string while moist) can be made very attractive by variations of form or color. The application of the simplest form of decoration to the larger dishes made by the oldest children is one of the possible beginnings of applied design; bands of dots or dashes are effective and easily done, but lines require too great muscular control.

Paper. There is probably no material which offers more possibilities for hand work than paper, but much of the success

of the general construction work suggested depends upon the quality of the paper, its toughness and pliability. When cardboard is used, it should be what is called "flexible cardboard," which does not crack where it is folded, and yet is light enough for older children to cut.

The first uses of paper very soon develop into the making of furniture, which may be given added interest and impetus by the introduction of paper dolls, for a doll sitting in a chair most naturally suggests a table, plates for dinner, and many other possibilities. Scissors should be where the children can get them as they are needed. The first tables, chairs, and beds will probably be without legs, possessing only one or two characteristics essential for the use of each article; but with repetition of the work and growth of purpose, the need of the details will be seen, and they will be added little by little. At a later period when this phase of the work is again taken up with the same children, a cardboard house of good size and a family of paper dolls may be used, and all the group can help in the furnishing.

There are many incidental uses which will come up and prove of temporary value, but work which centers around home life and community activities will be of special interest and worth. Older children can make single rooms of cardboard and furnish them quite completely, and the working out of a miniature community in the sand table or on the floor calls forth much ingenuity in constructing houses, stores and other needed buildings, together with wagons, fences, etc. Boxes and baskets can be made for a variety of purposes, and here again the constructive work supplies a motive for decoration.

The coming of spring suggests a number of ideas which can be successfully carried out. Crude kites, fans, and pinwheels can be made, and it is possible to add to the attractiveness of all of these by means of a decorative border or all over design. Simple hats for dolls and children are easily fashioned, beginning with those for dolls in order to give opportunity for experimentation as to the best shape, size, and trimming. Those for the children are modeled after the best of the small ones, and are used when working or playing out of doors. For the warm days a

simple sunbonnet and parasol may be made, cambric and cardboard serving for these, with a dowel stick for the handle of the parasol. They are developed in the same manner as the hat except that the plans are worked out with paper first, and when a satisfactory plan has been decided upon, it is used as a pattern for cutting the material.

The paper dolls which are such a stimulus to the young children in their use of materials, are cut out of wrapping paper in large numbers by the teacher, so that each child may have several if needed. It is not necessary to spend much time making these, for even if crude and all alike, they fulfill their mission. The dressing of the regular paper doll by the older children can be introduced at the time the house or room is being furnished and needs an occupant, or in the spring when all are interested in new clothes. A foundation pattern for dress and hat can be worked out, and from that a spring wardrobe may be fashioned.

A good supply of boxes and ribbon bolts of all sizes is a fruitful source of suggestion and furnishes much play material. Large boxes can be converted into houses and stores, and smaller ones into beds, cradles, wagons, etc., while ribbon bolts make good drums, churns, wash tubs, and other objects of cylindrical form.

Wood. The general use of wood in kindergarten and primary has not been possible for a number of reasons,—the cost of material and tools, large classes and crowded rooms, and, on the part of the teacher, lack of knowledge of the possibilities and lack of skill in handling.

Much of the success in using depends on having the right material and tools. Only the softest wood should be used, such as white pine and basswood; the hammers should be heavy enough so that the weight will help drive the nail, and yet not overtire the muscles of the arm; and the wire nails should have large flat heads, sharp points, and be of a size not to bend under the first inaccurate blow or two. If the teacher understands the use of tools, she can easily train a few or all of the oldest children to use a small hack-saw and bench-hook with ease and safety, and they can do all the necessary cutting of small pieces;

but, for the long cuts, it will be necessary to use the regulation saw which is not safe in the hands of children on account of its size and flexibility.

To make it possible for children to help plan some of the dimensions and prepare the material, it is well to order the wood in long pieces of the needed width and thickness, but none of the wood should be less than one quarter of an inch thick, on account of splitting. Where it is possible, the best means of introducing the use of wood is through a large box of odd pieces from a planing mill or carpenter's shop. This not only gives material for experimentation, but supplies many odd pieces when the more purposeful work begins. The younger children do little more than play with it, and learn to handle hammer and nails, but the older ones can make furniture for the large doll or the doll's house, the loom needed for weaving the rugs, also window boxes for starting seeds, and simple trellises for climbing plants. When it is desired to color the finished article a stain or dye is more satisfactory than paint.

Textiles. This term is used in order to conform to the general classification according to materials rather than processes, and under this head sewing and weaving will be presented.

The process of sewing is interesting to all children, but its possibilities in kindergarten are restricted by the fine muscular coördinations it ordinarily demands. Whenever it is used the materials should be coarse, in order to insure so far as possible large, crude work. A box of scraps of cloth and a small doll for each child offer an excellent opportunity for experimentation. Often the accidental shape of the piece selected suggests a garment, and at first only such cutting or rough shaping is done as the children feel is required. These rudimentary garments are sewed on the dolls by means of a few large inexact stitches. Gradually consciousness of better shape develops and very simple two-seam dress patterns are worked out in paper. These dresses are no longer sewed on the dolls, but are made so they can be put on and taken off.

Winter weather suggests the need of blankets for the dolls' beds and cradles, and the ends of these may be overcast with worsted.

With marble-time and marble-making comes the need of marble bags. Made of coarse net, these are very attractive when sewed together with bright worsted, either by overcasting or with a running stitch. Putting in the draw-string is a new problem because it must be set far enough from the edge to be secure, and in order to draw easily the stitches must be coarse and no double stitch must be taken.

For certain activities, such as work with clay, painting, cooking and washing doll clothes, there is a genuine need of little work-aprons. Cheap muslin is good for these. The children may be given oblong pieces of cloth of suitable size, and broad tape sufficient for neckbands and tie-strings; these tapes are measured, cut, and adjusted by trying on themselves or on each other, and the only sewing required is to attach the strings and bands to the aprons.

As in the case of sewing, it is questionable whether much weaving should be attempted in the kindergarten on account of the prolonged effort which most projects require, and also because the nature of weaving is such that execution must be much more accurate than is required in the processes previously discussed.

This work should be limited to the oldest class. With them large material, such as cotton roving, wide strips of cloth or felt, and the heaviest worsted, may be safely employed, and where strength is important macrame or seine cord can be used for the warp.

Rugs for the doll's house offer a simple form for the introduction of weaving. Separate strands of woof should be used in the beginning rather than a continuous one which is always difficult to manage. The children not only make their own looms, but set up the warp with little difficulty. Hammocks also should be woven with separate strands, the ends forming fringe at the sides.

On special cardboard looms, caps, hoods and muffs for large dolls can be very satisfactorily made. The worsted is threaded into a bodkin, and as joining is easily concealed comparatively short threads can be used.

THE USE OF MATERIALS IN THE KINDERGARTEN[1]

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It is the object of this paper to furnish an illustration of "The Method of Using Materials in the Kindergarten." This method has been developed at Teachers College with the students in the Training Class, and with the children in the kindergarten, the nature of the development differing only in the greater or less maturity of the group. The same principles are applied to all the materials of the kindergarten, Songs, Games, Stories, Conversation, Gifts and Occupations, and to their arrangement in the kindergarten program, but in this paper these principles are developed in relation to Occupation Material. The general nature of the use of any material is given by Dr. MacVannel as follows:[2]

"The contribution of the children is instinctive or impulsive activities. Through materials, the teacher presents a stimulus. The first motion is along the lines of the characteristic feature (or mode of action) suggested by the material or stimulus. Among the children (as in every form of life in a group) variations take place. The valuable ones are consciously selected and made the basis of activities moving to higher levels of experience. Expression of idea through technique, which transformed through comparison, emphasis, selection, criticism and reconstruction, is made the basis of a movement to a higher form, with correspondingly greater control, deepening appreciation, fuller realization of the meaning and significance of the experience to which expression is given."

In another place in his paper, Dr. MacVannel states this more

[1] Paper presented at the Training Teachers Session of the International Kindergarten, St. Louis, 1910.

[2] The Materials of the Kindergarten, TEACHERS COLLEGE RECORD November, 1909.

MAKING BLUEPRINTS FOR CHRISTMAS CALENDARS

BUILDING WITH LARGE FLOOR BLOCKS—BARN FOR COW

briefly. "Method as the realization of experience involves—(a) Activity, in the sense of experimentation; (b) Selection among and emphasis of such variations as approximate to or manifest a general principle or standard; (c) Organization through emphasis, selection, imitation, suggestion and the influence of vital personality. The movement is through activity (experiencing) to selection, to higher activity through a ceaseless process of organizing and reshaping experience."

In the development of any material, as Dr. MacVannel has stated, there are three factors, the material, the reaction of the individuals using the material in the sense of experimentation, and the teacher who presents the material and organizes the experimentation of the particular group with which she is working. While this statement is applicable to both the student in the Training Class, and to their children in the kindergarten, it seems better for our purpose to illustrate the method as developing with the children, because in the movement from the first instinctive activity to the more perfected results of the oldest kindergarten children, every phase of the process may be illustrated.

The child's contribution to the process is activity in response to the stimulus presented in the form of material. His attitude to any object is always in terms of what he can do with it, and he discovers its possibilities through experimentation. The nature of the material gives character to the experimentation, dry sand is sifted through the fingers, the pail is filled with wet sand, turned over and a form appears, buttons, having holes, are strung on a thread, spools suggest wheels for the wagon made of a box cover, mud is patted into pies, pencil marks are scribbled anywhere and everywhere. Thus the teacher, in bringing to the child any kind of material, offers a particular stimulus, defines a situation. The problem then of the kind of material that should be presented to the child of kindergarten age is suggested. From the standpoint of our subject, "The Use of Materials," all material that is simple and plastic enough to be used by children of kindergarten age with an increased control, and a freer and more artistic expression of ideas, is suited to this stage of development.

Materials then are regarded in the light of stimuli to the child's instinctive activity. Dr. MacVannel's first statement suggests the method of development in a general way. Variations occur in the first response of the group to the material. The teacher's selection among these results is the basis for renewed activity on a higher plane because of an increased control over the material, a clearer consciousness of the ideas that may be expressed in that particular medium, and a renewed sense of the relationship between the two.

Variations occur at each stage in the process, through the characteristics of the material, such as texture, color, size, form, number, etc., and because of the way different minds react to any particular stimulus. The teacher's selection among the results of the activity is the element which brings about development in the use of the material. It is her realization of what is valuable in what has happened that lifts the unconscious expression of the children into something more conscious and more controlled, and unifies the experimentation of the group. But how is the teacher to know what is valuable in any experience? What controls her selection in each stage of the process so that there may be progression in the children's activity? If the use of material is to be really educative, the teacher must have a standard.

This standard must enable the teacher to realize both the end and the beginning of the process. To see the beginning, she must have a general knowledge of the various ways that children might respond to materials, and she must also know the possibilities of the materials themselves through her own experimentation and use of them as mediums of expression. In addition to this, there must be a realization of the possibilities of material through the results of others' experimentation and organization, and there must be an appreciation of larger and more beautiful forms of expression as embodied in the art products of the race. All these elements contribute to make a general standard, but the standard would have no meaning if it were not always viewed in relationship to the various stages in the child's development, so that through the organization of the activity there is a growing realization on the part of the children of the possibilities of

the particular medium. Therefore the standard must also include a knowledge of the children's reactions at various stages in the use of the material. The standard is necessarily both adaptable and growing. It is adaptable because it is never seen apart from the present experimentation of the group, however crude that expression may be. The teacher's attitude is constantly, "In the light of my standard, what is significant in what has happened." The selection is always in relation to the particular stage in the use of the medium, not the most difficult nor the most finished result is selected, but that which will best serve as a means of organization for the work of the whole group. The standard is a growing one because it is constantly enlarged by the renewed suggestions, offered by the children's activity from day to day, and from year to year, and by the increased elements of control thus offered the teacher. The teacher's larger appreciation and new ideals gained through experience also contribute to the growing standard.

I should like to suggest some practical results of: (1) The recognition of material as a stimulus. (2) The selection of actual results of experimentation as a basis for renewed activity.

(1) If material is regarded as a stimulus, the manner and form in which it is presented to the child are of the greatest importance. Material must be presented in an orderly and artistic form, combinations of color must be harmonious, the forms presented must be suggestive, and care should be taken in the combinations of different kinds of material. As the results of one stage in the activity are regarded as suggestions for further activity, the artistic mounting of the work and placing in the kindergarten room are of great value in the children's realization of the nature of the results, and the work bound in books may serve to each child as a summary of the process of various materials at the end of the year.

(2) The selection of the actual results of experimentation as a basis for renewed activity brings about a clearer realization on the part of the children of the nature of the standard, and supplies a standard that may be approximated by all the members of the group, because it is related to that particular level of experience. Then too, the expression is always the children's

own, and so has that freedom and naïveté which characterizes children's work, and which is often more artistic than the more conscious expression of the adult.

In using the same method with the students in the training class and with the children in the kindergarten, the student in her junior year is realizing the principles underlying the process through their constant application in response to the experimentation of the junior class. As the same principles emerge in the use of various materials, they begin to be defined as "principles." The student also gains a larger idea of the possibilities of each medium through the experimentation of the individuals in her own class, for while the method is the same with children and students, the capacity and experience of the maturer group of individuals carries on the process more quickly and with more finished results. The presentation of the results of others' experimentation as embodied in schools of weaving, folding, etc., also becomes a part of the student's knowledge of the material. In the senior year, the materials are considered in relation to the activities and capacities of the children, and given practical application in practice teaching.

A general idea of the movement in the process from the first experimentation to more adequate forms of expression has been given. I shall now try to suggest with more detail the nature of the experimentation, and the particular organization as related to successive stages in the use of the material. I shall then illustrate the process with two kinds of materials. To quote Dr. MacVannel's statement again, "The first motion is along the lines of the characteristic feature suggested by the material." For example, in painting the natural response would be the putting on of color, in sewing pulling the thread in and out of the holes in the card. In the first activity variations occur. In painting one child may cover the paper with color, another may put on spots of color, one may use a great deal of water, another very little, one may scrub with his brush round and round or back and forth, another use longer and freer strokes. This first uncontrolled experimentation has brought about a certain familiarity with the material before the teacher has emphasized any particular result. With the

repetition of the activity, however, the nature of the emphasis is not merely "putting on color" but "how it is put on." The emphasis may be upon spotting, or it may be upon covering the paper with long strokes of the brush, but through the control of the activity, the quality of the result has been improved. And so with all materials the first emphasis upon the characteristic activity suggested by the material leads to the organization of the process underlying each material, from just "putting on paint" to "how we put it on," from "putting a needle in and out holes," to "how we put it through one hole and into another so as to make a stitch." The variations that occur through the characteristics of the material offer a means of repeating the activity with every varying interest and new possibilities. The paper may be covered with one color, another paper have a different color washed on. Different parts of the paper may be colored, or two or more colors may be applied on one paper and the blending of color where they touch suggest floating one color into another. Papers of various shapes may be presented, offering suggestions for the placing of color, as around the edge of a circle, or in the corners of a square, etc. The repetition of the activity results in an improved technique, and because of this increased power over material, the results will become more and more perfect and more suggestive. Through this continued and varied repetition of the activity, there enters another element in the development of the process. Ideas are suggested by the accidental forms resulting from the application of the paint or by the suggestiveness of certain combinations of color. The wash may suggest sky, half the paper covered with blue and the rest left white may be sky and snow, floated colors be soap-bubbles, the rainbow or sunset skies. As the spots take on form, the round ones are beads, flowers, trees or fruit. There is now a new element in the developing activity, the relationship between technique and expression of idea. The idea that emerges through the activity is made more conscious through repetition with an emphasis on idea expressed through control of the material. "How shall we put on color to make it look more like sky?" or "Which way shall we rub with the crayon if we are making grass?" "How far up on

the card shall we draw the green stem if we are to leave room for the flower?" The result is always seen in relation to the way it may be obtained, or in other words the emphasis is constantly upon the activity in relation to its taking on form rather than upon the idea alone. Through successive stages in the process the technique becomes more controlled, the ideas become enlarged, the representation more adequate until finally there is such a relationship between the idea to be expressed and the ability to express it, that the child may make the medium serve his purpose. The teacher's first emphasis on technique was but a means to an end, material used as a medium of expression.

Having described the nature of the process, I shall now illustrate in detail with two materials the nature of the reaction to a particular stimulus, and its development through successive stages in the process. As the character of the material controls the response, it seems best to select for our purpose two materials differing in character as sewing and painting. It can readily be seen that the holes on the sewing card and the strips in the weaving mat offer certain suggestions, and impose certain limitations which are not characteristic of the more plastic materials such as clay or painting.

In sewing, a child is first given a card perforated with a few large holes. The holes may be arranged in a circle or spaced at regular intervals so as to cover the surface of the card, the child may use needle and thread or a lacing, the latter perhaps being easier to handle. The response to this material is naturally pulling the thread in and out of holes. As a result of this activity, several things may happen, either on the various cards of the children, or all may be combined on one card in this stage of experimentation. The thread may have been drawn through a hole and over the edge of the card into a hole on the side through which it was first drawn suggesting such a stitch as "over-casting." Again the thread may have been drawn through the card and put in another hole on the same side, producing a line on the face of the card. The variations in this form of the activity would be the different length of line resulting from putting the thread through a hole close to the one first used, or one farther away on the card. The stitch

then is the result of the activity, and it is the production of a stitch that characterizes this process as "sewing."

What shall be the nature then of the first emphasis, sewing over the edge of the card, or across its face? It is wholly a question of what end we have in view in the use of this medium. If we wish to teach "sewing," we would emphasize the overcasting stitch, but if we regard sewing as material unsuited to children of kindergarten age, we describe the process as "drawing with thread," drawing under certain limitations imposed by the holes on the card. And in this connection I should like to suggest that limitation in this and in other materials is suggestive, and gives power in the use of freer materials such as painting and crayoning. The emphasis on the line drawn on the face of the card gives the possibility of many variations, long and short lines, horizontal and vertical, straight and slanting, and combinations of these lines resulting in outlined forms. The emphasis on the line over the edge of the card would lead to a certain uniformity of result, offering no possibility for development in this kind of material. We accept, then, sewing as "drawing with thread." The first emphasis would be on process, or the making of a stitch in terms of the activity. "Put the thread through the hole, put it in another hole on the same side of the card, turn the card and put the thread in a hole on the same side that it is coming out. Always put it in on the same side that it comes out!"

As a result of "making stitches," there begins to be variation in the kinds of stitches. Again these results are made more conscious in terms of activity. If the suggestion has been long or short stitches, the organization of the activity would be, "Put your thread through and put it in a hole 'far away' or 'near,'" as the case might be. With the little children, learning the process would extend over many lessons, but the variations offered by the material gives opportunity for many repetitions of the activity, different colored worsted, different shaped cards, and different arrangement of the holes on the card.

Through the variation in color, and length and arrangement of lines, the child begins to associate ideas with the results of the activity. Such ideas as windows, ladders, fences, wheels,

balls, etc., emerge through the suggestion of form, and grass, flowers, trees, etc., through the combination of color and length of line. In every material, while the first emphasis is upon technique, idea is constantly associated with the results of the activity because of the constitution of the child's mind and his use of analogy. When objects begin to be represented, and the child has too little control of the material for any adequate representation, prepared material, in the form of picture cards, is presented. Objects of simple form, such as balls, clocks, fruits, horse-shoes, etc., are suggestive at this stage of the activity. The process of sewing round a horse-shoe is the same as round a circle, save for the double line. In painting and paper-cutting, the use of material prepared by the teacher serves the same purpose, resulting in an improved technique and a clearer idea of the object represented through the simple and artistic form presented. Nor is this prepared material suited to the early stages in the process alone. Whenever the children seem to need a more artistic form of expression than their technique allows, some beautiful form may be presented to them. There is then renewed experimentation with material that offers more possibilities as in sewing the card with more holes. On the square card, a line may be sewed outlining the outside square; the remaining holes inside may be considered as windows in a house, or result in arrangement in relation to the outside square, suggesting design. In this connection, I should like to suggest the organic relation, in a little child's invention, between what is sometimes called "design" and "representation." What an adult would term design, suggests to him some object of representation, and illustration becomes design because of an instinctive feeling for arrangement. The characteristics of the material suggests placing in the earliest stages of the process, and in even such a simple material as peg-boards, design is illustrated. Long cards suggest repetition of a simple unit, square cards, symmetrical arrangement around a center. Before there is any particular emphasis upon design, there is much experimentation in picture sewing according to the suitability of the material. The children's inventions on the cards with few holes are along the line of one object with some characteristic detail as a house with windows and a chimney, a boat with a sail, a tent with a

STAINING FURNITURE MADE FOR THE DOLL'S HOUSE

WOOD WORK—FURNITURE MADE BY CHILDREN FOR THE DOLLS

flag, etc. The cards with more holes offer the possibility of more detailed and perfect representation of the same objects, and also the association with other objects, as a house and trees, boats and water, birdhouse and birds, etc. Through emphasis and selection, there results a more conscious combination of details in representing objects and a more conscious arrangement of the objects in relation to one another, resulting in good proportion. The most artistic form of expression in any material would be a combination of various forms or units, that had emerged through experimentation, in an artistic whole. This statement is as true of the building gifts as of sewing or painting.

In considering the development of painting, I have already suggested the first steps in the process, the elimination of the activities that offer no possibility of development as "daubing" or "scrubbing," and the emphasis upon spotting or the washing on of color. As in sewing, the variations in the first stage in the application of color would be through the use of different shaped pieces of paper and the application of various colors. The results of this activity would be colored washes or the arrangement of spots in relation to the shape of the paper. When dry, these results may be used in many ways. On the blue wash which suggested sky, may be pasted stars and moon, other colored washes may be folded for book-covers, or picture frames, or harmonious colors may be cut into weaving mats and strips and woven. The landscape idea emerges, as has been suggested, through the use of more than one color. The blending of color may suggest stained glass windows or Japanese lanterns and the older children may be given these forms and may themselves select the most beautiful part of the wash to be cut out in the form of a lantern or a church window. This may be done by the teacher for the younger children, and mounted in this form. Or the process may be reversed, and the children given a form such as leaves or fruits, which they fill in with color and into which they float other suggestive colors. The emphasis upon spotting would lead to more conscious representation of form, as in sewing. Combinations of spots may suggest clusters of berries or the relation of petals in a flower, etc. As the medium becomes more controlled, and the ideas

more defined, the children perfect their results by a study of the real flower, consciously trying to represent the object as they see it. In decorating paper-plates, book covers, May baskets, etc., the process is raised to the highest form of expression in design.

In giving the process in such detail, my aim has been to show principles actually in operation, for that is method. I am aware, however, that it is not an easy task, in a written statement, to show the organic relationship between theory and practice. A discussion of principles may remain so general and uplifted that we lose sight of their implications in actual practice. On the other hand, in a discussion of kindergarten procedure, practice too often is regarded as a multiplication of devices and not as principles at work. But when one is able to apply intelligently these principles to all materials, there should be certain results which are a confirmation of a method that is lifted above the mere use of devices. I should like to suggest the nature of these results.

(1) An eagerness by the individual members of the group to use any material presented.

(2) Spontaneous expression from all members of the group, because of the use of their suggestions.

(3) A growing realization of the nature of the standard by the group because of the teacher's emphasis and selection of actual results.

(4) A developing power in controlling material, and in artistic expression related to the nature of the material.

The Method, then, of Using Materials is "through activity (experiencing) to selection, to higher activity through a ceaseless process of organizing and reshaping experience." And this is the movement through all Educational Theory, all discussion and criticism are for the sake of "higher activity" in the form of better teaching. All discussion and criticism in relation to Training School problems are but for the purpose of giving power to our students of Kindergarten Theory so that they may put this power into the actual operations of the kindergarten. For it is in our work with the children that we must justify our theories, and make our teaching a vital force in the field of Education.

PRINCIPLES UNDERLYING THE ORGANIZATION OF KINDERGARTEN MATERIALS[1]

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In the above title several things are implied which it would be well to state clearly at the beginning. "Materials" is a dynamic term. Matter is inert substance but "materials" indicates a user and a use. The word "kindergarten" shows that there has been a choice, a limitation of possible materials. "Organization" points to the employment of some particular method. If there is choice of material and method there must be some reason for the selection, some purpose to be accomplished.

Kindergarten materials, like all materials in educational institutions, have two users, the child and the teacher. There are two methods of use; from the child's standpoint they are means to educate the self, from the teacher's to educate others. There are two purposes involved in their use, unconscious education of the self, conscious education of others.

What is the difference between these users, methods and aims? The child has a very meager experience, a confused outlook, limited means of expression; the teacher has wide experience, clear judgment, many well controlled avenues for expression. The little child's method of using materials is to satisfy some impulse or momentary need; the kindergartner's method is to make the present use of material a step in the whole plan of education. The child's aim is to live the passing moment to the fullest of his ability, the teacher's aim is to produce a being who can live abundantly through life and in eternity.

Our greatest problem is to reconcile these two methods and

[1] Paper presented at Training Teachers Session of the International Kindergarten Union, Cincinnati, 1911.

aims so that both users of kindergarten material will feel that they are really working together, re-enforcing each other's efforts and attaining a mutually satisfactory result. Since the child lives almost wholly in the present and the adult inclines towards viewing this moment solely as a part of the necessary preparation for the future, there must be some concession on the part of both if they are to come into sympathetic relationship. The child will be influenced by the point of view of the adult with whom he comes in contact, but he will be totally unconscious that he has so accommodated himself. The kindergartner can adapt herself with deliberate intention. She understands her own aim and also that of the child, she knows his present experience, his interest and capacities, she comprehends the steps by which he must advance. She can put herself in the child's place and realize what is to him the value of the present situation, while at the same time she sees with clear vision the value that it may have in forming mature ideals. The kindergartner must accept the immaturity of the child's desires and interests, but by the choice and encouragement of those she knows to be of worth, raise them to a higher level. It is this raising of a child's experience by selection which constitutes the organization of experience.

This selection must extend to all aspects of the child's experience. Out of his environment the kindergartner must choose for emphasis such facts as can be shown to have the greatest significance. She must use this experience not only in the way that he is using it, for the gratification of the passing moment, but also so that it will develop right attitudes towards the environment. She must encourage the expression of his idea which he enjoys and which calls for the best result that he can attain. Thus the organization of experience involves the selection of the things which a child uses and of the way in which he uses them. This selection is the organization of materials.

Froebel stated the principles which, used in the raising of experience, would organize materials upon a basis acceptable alike to teacher and pupils in their methods and aims. These he gives as self-activity, organic unity and development, used unconsciously by the child, consciously by the adult.

In order to view her work clearly as based upon these three principles, the kindergartner must realize wherein her use, that is, her method and aim, should differ from that of the little child. When she considers the principle of self activity, she must understand that the child expresses in his actions the impulse which is uppermost at the moment; the kindergartner should seek to guide him into the habit of expressing good impulses and later into the habit of judging his desires and making a choice of the better. The child aims like all living things to continue his existence by keeping active but this activity is stimulated by some accident of the environment; the kindergartner's aim is to make this activity of value by providing an environment which will be a stimulus for such acts as were found of worth in the development of the race.

The idea of organic unity as a principle is far from a child's thought but he delights in finding out what he can do with the things around him, of what use they are to him and in this way he discovers and reacts to their peculiar properties. (This "use" is not always physical, for instance, objects of startling size or activity as engines or birds, arouse the imagination and are found useful in his mental life.) The child also relates things to other things or people because of their use to each other. He may infer a relation also because of the usual juxtaposition of objects or because of their superficial resemblance as in size or form. For him each striking object generally stands as the center of its group, unrelated to other groups. The teacher can attract attention to things which will call for the discrimination of significant resemblances and differences and at the same time give these things a richer meaning by showing them in their relations to other things, that is, by showing their usefulness to each other. The child aims to understand himself and his world so that they may interact in a way which will be satisfactory to his developing personality. The teacher sees that this desire rightly guided will tend towards making the child feel himself functionally related to the world, responsible for a share in its progress, and, also, he will form the habit of studying things in their organic relation, distinct in themselves and yet necessary to the life of every other part.

When considering the principle of development the kindergartner sees that a normal child expends energy in gaining physical and mental control over his surroundings; she can stimulate the desire to reach such a goal that the full amount of effort of which he is capable will be put forth to gain the knowledge which will be of later value. A child in order to be happy must use effort in developing physically and mentally. A teacher sees that if he gains the habit of using the full amount of effort in the right direction, he will not only progress faster now but continue at a more rapid pace and reach greater heights.

A child's method and aim are all for the satisfaction of the present although based in a rudimentary way upon self activity, organic unity and development. The kindergartner's work is to provide opportunities for the child to gain the habit of using them in the most efficient way. She is conscious of her principles and must base her choice upon their widest interpretation. In her presentation of kindergarten materials she must try to aid the child to organize them by using them as means (1) by which he can act upon his experience for the purpose of expressing the best idea that he is capable of conceiving; (2) by which he can be led to see more fully the distinctive characteristics of facts in his environment and also their interrelation; (3) by which he can make use of his highest capacity for energetic action and accomplish a result of value in his progress towards race civilization.

The conscious use of materials has come about very gradually in man's development. In the progressing forms of animal life there was a continuous adaptation to environment, purchased by the elimination of those least adaptable. Finally there arose a race of beings who could imagine the possibility of changing the conditions which seemed to have the controlling power. As man's imagination grew, he strove ever more vigorously to bring about the seemingly better conditions. Man's consciousness of his distinctive function in the world, of adapting the environment for the sake of a far goal, was a very gradual development of thought. He still uses much of the knowledge that he has gained from contact with the world, to build up reflexes to meet old situations. From time to time wise men

have arisen who have seen the advantage in some accidental variation of old customs and have been able to meet other problems by modifying old usage. Then has arisen the idea of the possibility of altering the situation itself. Imagination began to grow through the presentation of actual physical conditions to be met and continued growing by means of the problems man feels in striving to expand on all sides of his developing nature.

It is through the long cycle of change of attitude towards the outside world that a child must go. At first he is governed entirely by circumstances but, long before he is of age, he must realize to what degree he can, and for what purpose he should, control his environment. The tiny baby is constantly reacting towards his surroundings but each stimulus conditions its response; the body is used like a mechanism. When he drops the spoon which is in his hand, not solely because the activity is enjoyable but because such action has previously given a pleasing sound, he has progressed through centuries of man's upward struggle. He is an incipient artist, a musician; his object has been pleasure unassociated with any necessary act involved in the preservation of physical life, and the technique by which the result was accomplished has also been ejoyable. When a child is stimulated through some of the avenues of impression to think of a horse and then searches for a cane or chair with which to express and so complete his idea, he is using a high form of thought in a rudimentary way. The act is not a direct response to the stimulation of the material which he later uses to carry out his thought; he has made for himself an environment and has controlled the conditions which seemed to govern him for the sake of something more satisfactory, more ideal than his present surroundings. A four-year-old child would need to have the material near at hand for the completion of his thought because he is not mentally strong enough to sustain an incomplete image for more than a few seconds, but in this illustration, he has made an attempt at the method of thinking which has resulted in the highest achievements of the race.

When a child reaches kindergarten age, he is ready to use material in several different ways. (1) There is still much that

he may learn by actual contact, many actions may still be impulsive responses to the qualities of the matter presented. (2) Many of the child's actions may be dictated by an adult or be imitations of copies set for him. (3) A child may be led to improve upon some form which he made while experimenting with the material. (4) Some idea may be stimulated, which in order to be complete must, through the expending of the full amount of effort, arrive at a goal which involves a clearer realization of things as distinct and also in their relations. This method may be called either the suggestive or purposive; if viewed from the teacher's side, it is suggestive, from the child's, it is purposive. It is founded upon the principles which Froebel realized as most educative because they organize experience.

A very simple illustration of the above methods may be given in the use of the divided cubes of the fifth gift. (1) A child might be left free to discover the possible uses of the half cubes, for instance, for a slanting roof; (2) some form with such a roof might be dictated or be imitated; (3) some form that a child had accidentally made, might be repeated with suggested improvements; (4) a different kind of material might be used as a stimulus, such as a picture of a barn, in order to arouse the desire to make such a form, and the blocks then placed in the child's hands. A double stimulus would be applied through picture material and block material. The child would have a more or less definite idea to express, would put forth effort in trying to accomplish it satisfactorily, would control means to bring about the end which he feels of value, and would discover the possibilities of the material itself. The more developed children can be led to understand why man uses the sloping roofs, and for them the stimulus provided might have been in the form of a little problem, how to make a roof which would shed rain. Sometimes the older children may have an idea so clearly in mind that they can make a choice of the familiar material which they think would be best adapted to carry it out; it is possible that several kinds of material might be chosen to express the same idea, in this way would be shown the unity of thought underlying manifold expression.

CLAY MODELING AND SEWING—PLAYING WITH MARBLES AND BAGS

SPRING PLANTING—THE PUMPKINS WERE USED FOR THE HALLOWE'EN PARTY

These different methods represent the different uses which man has made of his environment in gaining control over it. Each has some value in developing the right attitude towards the surroundings. None should be omitted in the kindergarten, none used exclusively. (1) If experiment is never allowed in the use of materials the children will not learn how to investigate, they will be helpless when confronted with any new problem, they will never advance beyond their companions but will lose the exquisite joy of discovery and contribute nothing to the knowledge of their own world. If no other method were used there would be only slow progress. A tendency would be formed to be governed by the moment's interest and not to sum up or connect. Respect might be lost for material and effort would lie dormant if no product could be conceived better than the one chanced upon. (2) If a child never imitated a good copy or followed a dictation he would miss some of the uses of the material which he was capable of appreciating but not discovering for himself. If this method were used exclusively, it would develop a habit of following blindly and the idea of taking the initiative would never be formed. (3) Where there is no repetition for the sake of improvement, there is a tendency to be satisfied with results that have not demanded a child's best effort, many things are attempted but nothing done well. A child can measure himself and gain fresh impetus for further effort when he sees two similar products placed side by side, one the result of to-day's work and the other of last week's. If this is the only method employed, the child uses each material for itself, never in relation to any other. It gives him a disconnected view of his environment, he will not feel the unity of thought underlying its various expressions in material. (4) If the purposive method is never used, the materials will never be organized upon the highest basis. A desirable end in view demands a child's best effort, right stimulation will not only call forth self activity to conceive that end, but also require that in its accomplishment control shall be gained over the particular material used and its relation shown to other materials through thought. If this method should be used exclusively, it would defeat its own object, the children would become dis-

couraged and effort paralyzed becaused they would be tasked to arrive at a result before they could control the means through which to attain it.

Another illustration will show more clearly the distinction between the purposes aimed at in employing methods (3) and (4). In the use of clay, after the first periods of instinctive response to the plasticity of the substance, the teacher might help the child to improve upon some of the forms which he had previously made by accident. This method aids the child to gain control of the particular material and if repeated in use of other materials, would form a habit of striving for better expression through all means at hand. Yet this is only one aspect of the right attitude towards the environment. There should be an expression *of something,* the environment should be controlled not merely for the sake of control, but because this control is demanded *in the relating* of experience. While respecting the laws of the material a child should make it conform for the expression of the thought which is seeking for completion—relation—in his mind. In using the purposive method, with clay, a child might be aroused to think of some form which would be related to the experience through which he was passing and which could be adequately made in clay and also would require an improvement upon a form previously modelled. One material would be made to re-enforce and interpret the other and the child would gain a feeling of the relation of the resources at his command.

If a child is to develop towards his environment, the attitudes which man appreciates as of worth, that of trying to understand it, of respecting its laws, of improving upon it, of bringing it into a unified relationship, opportunities must be given to use material in all the four ways mentioned above. Yet, if the organization of materials is our object, that method which accomplishes this purpose best should be the one used whenever possible. All methods should be used with each material at some time in a child's life but some materials are much more difficult to control than others and with these materials having complex laws, it may not be possible to use the purposive method in the kindergarten except in a very rudimentary way. With

many kinds of handwork it is possible to use all methods at the kindergarten age. The period between four and six years is the time when there is a decided change in the character of the purpose for which materials are used. At four the gratification of the passing moment is all that is sought; at six, the result and simple means by which it is attained are much enjoyed. These facts should in a general way decide the kind of method predominant at the beginning of the kindergarten and that at its close. It should be mainly experimental at the beginning and purposive towards the end.

The above facts decide only the general outline of method in the program. The factor which determines the particular kind of method used in each lessen is the degree of control which the child has gained over the material placed in his reach. Opportunity should be given for instinctive response towards new material. The next periods might be devoted to the improvement of some form previously made very crudely. When a fair amount of control has been acquired, the child may seek to express some idea that has been roused through other material. Imitation may be used at any time that the kindergartner feels that the child is ready for some use of the material which he would miss or be slow in discovering. Dictation can take the place of imitation but it must be remembered that "come" guides a child better than "go." Dictation is excellent as a playful test of what a child has learned about the particular material.

The function of the kindergartner in the child's organization of materials is simply to adapt the environment so that it will provide proper material. This material should respond to some desire of the child and yet stimulate towards higher attainment than he would reach alone. The kindergartner has organized her materials in so far as she can see them as response and as stimuli.

Each material which we now use in the kindergarten had some definite part to play in the organization of the experience of the race. Only very brief mention can be made of a few of these materials and their function. The best stories have been interpretations of the truths underlying action and they

have aroused men to strive for ever more worthy ideals. Games have afforded an opportunity for the young to learn valuable lessons quickly through imaginary rehearsals of what was taught to their elders by wrestling with actual conditions. Handwork has enabled man to learn more definitely about his surroundings and has brought to him the enlargement of personality which is felt by one who understands his world and can control it in order to create permanent results.

In the application of the purposive method to handwork, distinction must be made between the two aspects of the value which man has found in its use. (1) He has been able to experiment and learn about his world, and (2) he has felt any result accomplished when effort has been called forth, as a part of his very self, his energy has gone into the product and made it a thing alive with his spirit. Froebel formulated for us the "gifts" which allow most freely for the experimenting and discovering and the "occupations" which emphasize the product.

Since effort is to be demanded with this purposive method, it is well to know in what direction a child should be encouraged to expend it. In the easily transformed material, blocks, sticks, etc., Froebel saw that children worked as adults do for three different reasons, depending upon the aspect of their experience which they were emphasizing. "Forms of knowledge" summed up what they knew about their environment; "forms of life" called for more activity and consequently more experimenting and learning; "forms of beauty" called for an arrangement, a choice, which gives a contemplative attitude towards experience. These same divisions may be found in the use of the occupations. Those which sum up experience might be called the graphic; those which result in forms which demand more activity, the constructive; and those which call for selection or discrimination of values, the aesthetic.

If the kindergarten is to provide for all ways of using material which are educative, there is a variety in handwork which is bewildering in its richness. The use may vary (1) with stimulus applied, (2) with purpose appealed to, (3) with method employed, (4) with character of result desired, permanent or

transitory, (5) with kind of material presented, and (6) with the way in which means are adapted to the end.

The stimulus could be language, a story, conversation or song. It could be a picture. It could be some experience, such as a walk or a flower. It could be some other child's use of the material or some imaginary need, as a coop for a chicken. This list could be added to indefinitely.

The purposes which the child might have in mind are mentioned above, (1) to tell what he knows about a subject, (2) to play out some experience, and (3) to show its beauty.

The methods might be (1) placing materials in the child's hands for experimentation; (2) dictating or showing some form; (3) improving upon a form previously made; (4) arousing an idea and providing means for its adequate expression.

The gifts could be used when the child needed much experimentation to arrive at a desired result or when the properties of the material were demanded for the result aimed at. The occupations could be used when the children were able to imagine and strive for a more or less permanent result.

The handwork materials vary from blocks to seeds, from clay to paper cutting. Each is appropriate for a certain kind of experimentation or product and they vary in complexity and so respond to the child's desires at different stages of his development.

The use can vary by the way in which means are adapted to ends. A child might have the material placed in his hands which would suggest very plainly the carrying out of his idea. With more complex material children might work together for a common product, which could then be copied exactly or modified according to individual taste. At other times child and teacher might consult as to the best means for arriving at results. Occasionally a finished product might be shown which would spur the children to discover the way in which it was accomplished.

It is by means of these numberless ways of using handwork that the little child's experience can be organized. Growth comes by lifting this present moment's act above the level where the

child's unaided efforts would place him. A beautifully finished product does not necessarily imply a development of the power of organization in the child's mind. In order that the product should be educative it must be the result of his self-impelled desire to express, his own power of adapting means to ends, and it must show things in the relations he has been led to understand. Browning voices the relation between product and effort in Rabbi Ben Ezra.

> "As it was better, youth
> Should strive, through acts uncouth,
> Towards making, than repose on
> Aught found made."

The story of man's progress is the story of imagination and effort working hand in hand, the one thinking ever more of God's thought, the other grasping ever more of God's spirit. The teacher's duty and privilege is to lift humanity so that it may become more conscious of its divinity. This selection, this lifting, involves the organization of materials upon the principles which God is revealing to man in His work.

THE GIFTS[1]

Luella A. Palmer

So much could be written and said about the "gifts," their nature, purpose, and method of use, that it seems a very wide subject for a twenty-minute discussion. After a paragraph or two of introduction with regard to the nature of the gifts, this paper must be confined to a consideration of the purpose in their use.

As man's knowledge of the world grew, he found that this knowledge fell into related series, a time series (history), a place series (geography), an order series (arithmetic), a form series (geometry), etc. The separation of knowledge according to these aspects was an advanced and highly organized way of looking back and interpreting actions which had arisen in concrete situations. Knowledge was at first a vague whole, the first groupings were large and ill-defined, very gradually details were discerned, and classifications became more limited and more definite.

When schools demanded books which would present to children knowledge in concentrated form, the text-books provided were written by men who had a logical grasp of each subject. They therefore presented information in a logical order. Provided in this way it was expected to give the same insight into the subject which the adult had. Educators did not realize that a child's mind could only gain through actual experiencing that power of organization which would enable him to relate in definite series, to see logical order. They did not understand that the powers of the mind are organized through the following out of a psychological order and that in the process would come the comprehension of an ever more logical order.

Schoolmen and teachers have now become conscious of the defects in their theory and are rapidly changing their methods.

[1] Paper presented at International Kindergarten Union, Washington, 1913.

The worth of any study is now felt to be the degree to which it provides material for the child's mind in its developing. The presentation is not according to the logical development of the subject matter, but the employment of that sequence "which is essential in socializing and psychologizing the experiences and activities." The distinction between information and wisdom as results of education is being sharply drawn. Dr. Dewey says: "Information is knowledge which is merely acquired and stored up; wisdom is knowledge operating in the direction of powers to the better living of life. Information, merely as information, implies no special training of intellectual capacity; wisdom is the finest fruit of that training."[2]

Kindergartners must not be the last to criticise their own work in the light of the theories which are making for more efficient education. When Froebel outlined the "gifts" and "occupations," he wrote for the kindergarten what corresponds to text-books of other grades. These presented what he considered subject matter for early education; they presented it logically and it was to be given to the children in its logical order so that the children would become more conscious of that order. They were to learn verbally the facts about it so that these facts might make some impression upon the mind. The recent investigations into the working of the human mind have taught us that although the adult may see a definite logical connection within materials, this cannot be brought to the consciousness of immature minds; it can only be viewed logically in so far as it has been *used* psychologically. Logical insight will only be granted gradually and only after many vital experiences with the material. In the light of this fact, each kindergartner must test the worth of any material that she uses and its method of use.

The "gifts" as Froebel formulated the series may be considered in three ways.

1. As materials forming a complete logical unity within themselves.
2. As materials which the teacher uses to guide the children.
3. As materials which the child uses to organize his powers.

[2] Dewey: How We Think, page 52.

SEWING—MAKING KINDERGARTEN WORK APRONS

WEAVING—PUTTING DOLL TO SLEEP IN HAMMOCK MADE BY CHILDREN

1. That there is such a logical relation between the gifts is interesting, but that it is necessary to have materials for a five-year-old child which will show this relation, is another question. The completeness of the circle which they form is entirely beyond the vaguest comprehension of a little child. The materials which should be chosen for his education are those which will present the amount and degree of logical order which he is capable of comprehending.

2. The kindergartner can use her material in two ways: by emphasizing (a) material or (b) the child.

(a) If she endeavors to bring to the children an idea of the connectedness of the material, she must plan a series of steps in which the children are to walk. These can be taken either by following direct dictation, or by such careful limitation of the child's possible advances that only the right step can be taken.

(b) If the kindergartner views the gifts as means by which to develop the child's powers, the consciousness of their logical order will be present in her mind only as a goal which she hopes the children may reach some day. She will view each separate material in the light of its worth for organizing the child's present experiences and activities. This may lead her to discard some gifts and emphasize others. Such as she retains will be used for a purpose exactly in line with the child's purpose, except that she will realize which paths will lead most surely toward the later logical interpretation of the universe, and the child will only unconsciously strive toward the same result. Since "the psychological and the logical . . . are connected as the earlier and the later stages in one continuous process of normal growth"[3] the kindergartner will try to use the materials in such a way as to follow the order of ***mental growth,*** rather than the order within the material.

3. The child's experiences and activities can only be organized through a sequence which is sociological and psychological. This seems a vague statement. It means that what is provided in a child's environment and what he is encouraged to do, will arrange his ideas in the best way when such things appeal to

[3] Dewey: How We Think, page 62.

his gradually expanding nature and lead him toward acceptance of social standards. If the gifts are materials which help a child to organize his powers, they must give him such experiences and call forth such activities that his mind will be developed and in the direction that humanity has found of most worth.

With regard to point (1), to see the gifts as a complete logical unity is not the immediate purpose in the kindergarten. With regard to the point (2) the kindergartner should use the materials in line with a child's best development. It is the gifts in relation to the last point as materials which the child uses to organize his power, which will be taken up in detail in the rest of this paper.

The earliest gift lessons somehow left the child out of the planning except as a kind of mechanism; by supplying the power which moved the gifts in a certain way, he was supposed to connect them with a cog which moved his mental machinery in the same direction. The results were to be forms of life, knowledge and beauty as judged by the adult, that is, the results were in the material and it was hoped that corresponding results were within the children's ideas. The methods were to be dictation first and foremost, then imitation, etc.; methods were something contributed entirely by the teacher. In most kindergartens of to-day, the forms made with the gifts may appear much the same as those of fifty years ago, but each one is considered in the light of the development which it has given to a certain aspect of the child's nature. A "form of beauty" is not such *for educational purposes* unless it is evolved from a child's own feeling and is the most beautiful which *he* can make.

The methods which are educational must be those of the mind's own working. "Thinking involves the suggestion of a conclusion for acceptance, and also search or inquiry to test the value of the suggestion before finally accepting it. This implies (a) a certain fund or store of experiences and facts from which suggestions proceed; (b) promptness, flexibility, and fertility of suggestions; and (c) orderliness, consecutiveness, appropriateness in what is suggested."[4]

[4] Dewey: How We Think, page 30.

This can be applied to a child's use of material. (a) The mind must have something to work upon, consequently the normal child is curious and tries to find out things; (b) the mind must have a number of ways of reacting upon material, so the child builds up and tears down an infinite number of times; then (c) the mind finds some order in these many suggestions and arranges them for easy reference.

Left to himself a child might evolve relations between materials which would be trivial. It is the teacher's duty to help him arrange his experiences in ways which will be most useful. This order is best developed by providing some stimulus which will inspire a child to outline some end, and then find suggestions which are most appropriate to achieve this end. The mind thus forms a habit of calling up suggestions, relevant because of some classification which is vital and then choosing those which are most significant for the occasion; this is reflective thinking or reasoning.

The three aspects of mental activity outlined above, investigating, testing, and arranging, represent the normal process of a child's mental growth. It is only after much direct contact with various materials that an individual is willing and able to learn from the experience of others. There are, therefore, three general purposes in the use of material: (1) to discover its possibilities; (2) to apply this knowledge, get a rich variety of experiences in connection with it, and (3) to choose some end which will bring order and consecutiveness into these suggestions.

With these general purposes in mind, the specific purposes of different gift lessons might be as follows:

(1) To investigate, to discover properties of the material, its characteristics and possible uses.

(2) To formulate some purpose, possibly suggested by the sight of the material, and to control material to carry it out.

(3) To observe and follow another's use of material.

(4) To formulate a purpose in line with some past experience which has been vivid, and to control material to express it.

(5) To follow another's use of material because it is well adapted to express some idea about past experience.

(6) To discriminate between the values of the material in order to choose the kind best suited to express an idea.

(7) To exercise memory by repeating some form which has been made at a previous time.

(8) To express the beauty or scientific facts which *he has discovered* can be shown through the material.

(9) To show control of the technical naming of the material by following a dictation.

(10) To coöperate with others in the use of material, by adding to some large form, or by building a smaller form which is needed to express an idea which has been decided upon by the group.

Lessons given with these different purposes in mind would take into consideration the mental development of the child through the use of material, the social values that may be found in using materials, and also the characteristics of the materials used. While all lessons would have all of these purposes in some degree, for instance, discoveries should be made every time the material was handled, point (5) states the one which seems to include them in equal degrees, the other lessons emphasize one aspect more than the others. Points (3) and (10) emphasize the social aspect; points (2), (4), (7) emphasize the psychological; points (1), (8), (9) emphasize the material; point (6) both the material and the individual.

How would lessons given in these ways help to organize a child's mind?

(1) If given in the right way a lesson with investigation as its object would help a child to gain an *attitude* of trying to learn the possibilities of any new material and of trying to interpret or use them. He would become alert to situations and eager to find problems. Kindergartners have allowed too little for investigation, they have felt it necessary to tell children many thing which they could find out. "For teacher or book to cram pupils with facts which, with little more trouble, they could discover by direct inquiry, is to violate their intellectual integrity by cultivating mental servility."[5] Even the facts which we have thought necessary to tell children about the gifts have

[5] Dewey: How We Think, page 198.

not been the most important ones for them. "Variations in form, size, color, and arrangement of parts have much less to do, and the uses, purposes, and functions of things and of their parts much more to do, with distinctness of character and meaning than we should be likely to think. What misleads us is the fact that the qualities of form, size, color, and so on, are *now* so distinct that we fail to see that the problem is precisely to account for the way in which they originally obtained their definiteness and conspicuousness. So far as we sit passive before objects, they are not distinguished out of a vague blur which swallows them all. Differences in the pitch and intensity of sounds leave behind a different feeling, but until we assume different attitudes toward them, or *do* something special in reference to them, their vague difference cannot be *intellectually* gripped and retained."[6] A child must build up a variety of experiences before he can discriminate those things which adults feel are values.

(2) When material is placed in a child's hands (with which he has already experimented) he ought to be able to formulate such a purpose for expression as can be carried out through the material; in other words, he ought to adapt his ideas to bring them somewhat in line with the possibilities of the material and then have perseverance enough to arrive at his self-determined end.

(3) It is good practice for a child to follow others sometimes and particularly when some one has discovered a very good use of the material. It not only gives the child a good model but it spurs him to strive himself for better interpretations of the material.

(4) A lesson which leads a child to formulate a related purpose and then express it, will develop reasoning and perseverance, and calls for creativity of the highest kind. A child must be inspired to want to express a certain idea; he must think of many different possible ways in which he could express it, select the best, and then persevere to the end to carry it out.

(5) A lesson where the children copy another's model because that other has been able to plan a purpose which is connected

[6] Dewey: How We Think, page 123.

with what they are trying to express, has the same kind of social value as the third type of lesson, except that the purpose is a little more organized; it is the controlling of material, not to make some irrevelant, incidental object, but to follow some connected line of thinking.

(6) When children choose the material which is best adapted to express some idea, good reasoning ability is developed. Such a lesson calls for some vivid idea to be expressed (in order to give some purpose for expression), then, a consideration of many possible ways in which it can be carried out; next, the selection for definite reasons of that material which is best adapted to (has greatest number of possibilities for) expressing the idea; and, lastly, the sustaining of the effort until the completion of the idea.

(7) Repeating a form is a play which the child likes to have with his own mental control; he likes to test his power of recalling some act which it gave him particular pleasure to accomplish. He relives the joy just as an adult does when he repeats the story of some happy experience.

(8) Through the use of the material a child will discover that it is beautiful when placed in certain ways, or that there are certain numbers, size, and form relations between different parts. If a problem is set before him as, for instance, to lay the longest possible sidewalk with the bricks, he will be elated over the solving of his problem. Care must be taken in the presenting of problems; only a few should be given in which the accomplishment of the deed is the sole end sought; this is not a high aim. Activity which has a purpose beyond that of its own realization is the kind which is of most benefit to mankind.

(9) Through playing with the material a child will discover that certain possible uses of material are accompanied by certain similarities in form as, for instance, that it is best to choose an object with a flat surface if it is desired to have a form which stands still, or, that objects with long sides make higher houses than those with short sides.[7] These characteristics linger on the borderland of knowledge unless they are given a name.

[7] Refer to Dewey, page 123.

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It makes them more definite to provide a term which the child feels will cover the facts which *he has discovered,* and which will be intelligible to his associates. A technical term should be given in order to "preserve a meaning" or to make it possible to "transfer a meaning" which a child has found in his use of materials. A dictation lesson should not be one in which the teacher has done all the thinking for the child and he has merely followed directions. "Sheer imitation, dictation of steps to be taken, mechanical drill, may give results most quickly and yet strengthen traits likely to be fatal to reflective power. The pupil is enjoined to do this and that specific thing, with no knowledge of any reason except that by so doing he gets his result most speedily; his mistakes are pointed out and corrected for him; he is kept at pure repetition of certain acts till they become automatic."[8] A dictation lesson should be a playful test of a child's grasp of the terms which show the definiteness of his discrimination with regard to the material. Such a lesson should help him to make his ideas clearer. The word should always come after experience with the material; it should represent a summing up of experience.

(10) A lesson with the purpose of coöperating with others in the use of material would demand quite a degree of social control, a willingness to subordinate one's individual preference for the sake of making the group result more complete. This could only be done with older children in the kindergarten. The results in the material, therefore, should show a good understanding of its characteristics and of selection of the best means to get the result. Such a lesson as this would show the degree to which a child had been led to organize his ideas of the material and of himself as an individual in the group. It would call for reasoning, perseverance, creativity, coöperation.

Lessons of all these different types are needed in order to appeal to the whole nature of a child, yet those which organize his powers on the higher planes should be given as soon as he is ready for them. The kind of material used, the ease with which it can be controlled, and the number of times it has been used, will govern to some extent the type of lesson, although

[8] Dewey: How We Think, page 51.

NO VIEW ATTACHED

the first use of any material would probably be that suggested under (1).

Not all of the Froebelian gifts could be employed in the ways suggested above, because they are not the best material through which a child can expand socially and mentally at the kindergarten age. That is a story beyond the twenty-minute limit. It can merely be stated dogmatically that the Froebelian building blocks are the best materials that will be found to help in a child's growth; that sticks, seeds, and colored balls are materials which a child enjoys and which can be used educationally. There are many doubts as to the value of the rest of the gifts. The above types of lessons can be used with any material suitable to be introduced into the kindergarten.

In the limited time I have tried to show how teacher and child can be in perfect sympathy by providing such stimulus for expression that the child will delight in putting forth all the energy which he has at his command and in the direction which the teacher knows will be of value in his steady development. Lessons given for the purposes stated are much more difficult to arrange than the ordinary sequences, giving logical steps in the manipulation of the material. They require on the part of the kindergartner, (1) a working knowledge of the normal process of mind development; (2) an intimate knowledge of each individual child so that he can be helped to his next step in advance; (3) keen observation and ready adaptability to take advantage of contributions which are of value to the individual or the group; (4) good control over the possibilities of material and of its educational presentation. Even a poor teacher can follow a series of logical lessons and dictate the forms to children gaining visible results which appear fine on the surface; it takes a superior teacher to respond to each child's need so that he is developing at the rate which is most consistent with his continued and steady progress. A teacher's method is "anything in the atmosphere and conduct of the school which reacts in any way upon the *curiosity*, the *responsiveness and the orderly activity of children.*"[9]

[9] Dewey: How We Think, page 46.

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A STUDY OF GEOGRAPHY IN NORMAL SCHOOLS

Inasmuch as teachers in elementary schools are largely trained for their work in the public and private normal schools and city training schools, a study of the work in geography in normal schools gives an index as to the adequacy of the training of teachers for geography work in elementary schools. Obviously the character of possible work in geography in normal schools depends upon the preparation of pupils on entrance, on the length of the training course, and on the number of subjects that pupils are expected to cover in their training period.

In order to make a comparative estimate of the geography offering in the public normal schools of our country, a study was made of the work in one hundred and forty-four schools of this class. The larger amount of information was secured from the published announcements of the several schools, but this was greatly supplemented by personal letters from administrative officers and teachers of geography, as well as by conference with many workers in the field.

Of the one hundred and forty-four schools studied, seven admit elementary school graduates to a course in elementary teaching usually consisting of four years. In these seven schools, four offer no geography; two require work in physical geography; one in physical, continental and commercial geography; and one offers elective work in physiography and map modeling.

In by far the larger number of cases admission to the course for training for work in the elementary schools, is high school

graduation, or its equivalent. While some normals admit in both ways, others admit students by examination—details thereof not given—and seemingly others admit on personal inspection of the candidate by some school officer. The usual normal school course is a two-year course beyond a high school, and it is of these schools that this study has been made.

In the one hundred and forty-four schools studied, geography is offered in some form in one hundred and thirty-one, and is required in some quantity in one hundred and three. In one hundred and nine schools offering a two-year course beyond a high school, geography is required in varying amounts in seventy-eight. Of the thirteen schools making no mention of geography five offer courses in geology, of which one offers eight courses in geology.

In the one hundred and nine normals offering geography in some form, no electives are offered in fifty-five. The maximum requirement found was three courses, five hours each for a half year; the minimum was thirty hours and the average perhaps one hundred hours. In many instances elective courses based on the required work are offered, and in a few cases students may continue in a degree-giving course and secure more geography. In many schools the work is given entirely through courses in methods of teaching, but in an increasing number of schools, departments of geography are maintained in an efficient manner, and work beyond the immediate review needs of the pupil-teachers is offered. The table on page 3 showing the offering in ten schools requiring high school graduation for admission to a two-year professional course will indicate the variety in the geography opportunities. The details here shown are taken at random in the order of original study of work.

A summary of the work throughout the country indicates that the amount of training in geography is, in general, inadequate in quantity, and often in quality, as a preparation for teaching one of the five fundamental subjects in the elementary schools, at least to one especially interested in geography. This inadequacy in quantity is recognized by many enthusiastic teachers of geography and by some administrative officers, but the interest in improvement is not general as is indicated by the following detailed statements.

AMOUNT OF REQUIRED GEOGRAPHY	NATURE OF WORK REQUIRED	GEOGRAPHY ELECTIVES OFFERED
1 term	Methods	Geography and physiography
1 term	General geography, methods	North America, Eurasia, commercial geography
100 hours	Principles	Methods, local geography
0		Political and physical geography
½ year	Physical geography	0
2 courses	Physical, economic and regional	Physiography, agricultural geography, principles, methods, Europe, economic geography, social and historical geography
16 weeks	General and physical	0
2 hours, ½ year.	Not stated	Map drawing, methods, North America, regional geography, physiography, meteorology, economic geography, Europe
4 hours, 1 term.	Physiography	General geography, social geography of North America, of South America, of Europe, state geography, commercial geography, geography and American history
0		Industrial geography, physiography

In one of the largest normal schools no work is prescribed, but three courses are offered and two given. The character of the work in this school is indicated by the following excerpt:

"In our physical geography course we cover the text-book in twenty-four weeks, five recitations of fifty-five minutes each week. We do no laboratory work in the subject; this work consists simply of text-book assignments and recitations on these assignments. The subject is taught by the head of the physics department who has no time to devote to any outside work in the way of field study, study of contour maps, or any work of that kind.

"In our course in descriptive geography, we use ———— book on geography method as a text. The course covers twelve weeks and is given primarily to students who expect to teach

in the rural schools. We devote six weeks to a study of the text, two to three weeks to a study of modeling, map making and other modes of expression. The last few weeks are devoted to a study of the state course of study with particular reference to geography.

"We have no head of the geography department and the Principal tells me that he does not consider the geography work in any normal school to be of sufficient importance to justify the institution in adding a head of the geography department."

From one of the more progressive normal schools of the country comes the statement that for high school graduates "one term of geography"—so called "review," is required. "This course combines the work of method and subject matter, dealing with the elements of geography, with which we spend the larger portion of the term. While our students come from high schools, about forty per cent of them have had no geography whatever beyond the seventh or eighth grades."

From one of the states most widely known and praised for its excellent work in normal school geography, some illuminating facts have recently been given as to the geography preparation at admission and at graduation from three large normal schools. Of 1678 high school graduates admitted to these three schools, 28 per cent had no geography in the high school, 34 had one-half year's work, 30 per cent had one year's work, and 8 per cent had one and one-half year's work. Of 648 graduates from these normal schools graduated with a life certificate, 41 per cent had no geography work while in training, 42.3 per cent had one twelve-weeks term, 12.5 per cent had two terms of the same length, 2.3 per cent had three terms, 1.3 per cent had over three terms.

The general deficiency in geographic training of senior students in normal schools is recognized in many localities, but not generally so. One large normal now requires the passing with high standing of an examination in locative geography before admission to the senior year, thus indicating that others besides the geography specialist recognize the general need of a knowledge of the A B C's of ordinary school geography.

However unsatisfactory may be the time given to geography

in normal schools, the use of the time available is even more discouraging when the field as a whole is viewed. Of the required courses in geography given in the schools studied, 38 are physiography, 9 are commercial geography, 66 are methods, 29 are "geography," 48 are regional geography and review, 5 are principles, 2 geography and history, 1 is map drawing, and 3 are geology. Or of the 200 courses in geography, 50 are high school in type, and 140 are either methods courses or regional courses. Of the latter, the larger number are merely review courses of elementary school geography, as the description of text-book used will indicate.

Of the elective courses offered in the two years' normal courses, numbering in all 162, 41 are physiography (5 advanced in type), 27 are commercial geography, 25 are methods, 9 are "geography," 6 are entitled principles, 6 are rural school geography, 42 are regional geography, largely review courses, 4 are geography and history and 2 are devoted to map drawing.

The emphasis is given in the large to a review of the elementary facts of geography which form the larger portion of elementary school courses, and to methods of teaching in elementary schools. With this limited attention to geography in our normal schools, and with the work, except in a few shining instances, either high school physiography, methods or review of elementary texts, is it any wonder that geography is so widely considered merely a children's subject that has not grown up ? In a few institutions, slowly but surely increasing in number, specially trained teachers are giving work in geography of very superior quality. They are the beacons that are pointing the way to the more conservative schools on the one hand, and, on the other, to the newer institutions in which the requirements in education are so great that a serious study of the materials of the elementary subjects is impossible. This sad picture with its uninspiring general tones, has a few high lights that catch the eye and redeem the composition as a whole.

The causes of these conditions are many. In the first place, educational theory and practice, as important to the prospective teacher as is the knowledge of materials, in many institutions are over emphasized, and little time is left for the study of so-called academic subjects, other than from the bread and butter

point of view. In the second place, pupils who enter the normal schools from a high school course have, as a rule, no knowledge of geography beyond that gained in the sixth or seventh grade of the elementary schools. Elementary school geography is rightly, and probably will remain, largely regional geography with an increasing emphasis in the higher grades of causal regional geography, culminating in a study of the reasons for economic and social conditions. High school courses of study in geography are usually specialized courses in physical geography or physiography, or in commercial geography. Thus the geographic training of the prospective teacher, on admission to the normal school, has been away from the field of elementary geography, and the normal school teacher of geography must bridge the gap as effectively as his limited time will permit.

Three methods of procedure are possible. The easiest for the teacher not trained in higher geography, is to review the details of elementary school work, as is so frequently done. The pupil-teachers thus go out to their work with a preparation little beyond that of the pupils in the upper grades and rarely with any new point of view that will make it possible for them to vivify a subject deadened by a mass of detail. The margin of safety of the young teachers is slight the ice is always thin, and they naturally expose themselves to the dangers of the subject as little as possible.

The second plan, the systematic, is to organize the normal school work so as to treat in turn the underlying principles of geography, some special continent from a causal standpoint, and methods of teaching geography in elementary schools.

A typical plan followed in many schools is indicated by the following official statement from one of the newer normal schools:

GEOGRAPHY

(This subject is required three hours per week throughout one year)

The course aims to give an understanding of the control which climate, surface and other geographic factors exert over the life of man and animals upon the globe; a knowledge of and ability to use the authoritative source material available; the ability to read maps, and some of the best ways of presenting the subject to children.

The first half year's work is devoted to a study of mathematical geography, the atmosphere, the lands, the work of running water, and the oceans.

As much field work as possible is done in this connection, as the school is particularly well situated for it.

The first half of the second semester is devoted to the study of the continent of North America and the countries of Europe most closely connected with us through trade. Through this study the pupils are expected to gain an insight into the method of continent study for the grammar grades. Particular emphasis is laid upon the influence of geographic environment in determining routes of trade, location of industrial centers, and the distribution of commodities.

The work in methods of teaching geography is left until the last quarter in order to take advantage of the instruction in the art of questioning and in making lesson plans given in the course in General Methods. The chief divisions of the work are a study of the content of geography; determining factors in arranging subject-matter for different grades; methods of teaching as applied to subject-matter determined for each grade. Each student prepares lesson plans for different grades and teaches the class.

This complete cycle is often cut by omitting the regional treatment, or the work is confined entirely to an elementary study of physical geography. This phase of geography is naturally the easiest to teach, because of the number of excellent physical geography texts and laboratory guides. To stop with this phase of the work is to give an over-emphasis to foundations, and not enough to the applications of physical geography in the interpretation of regional geography, the larger phase of elementary school geography.

In many schools, a compromise plan is followed whereby the elements of physical geography are followed by a study of economic or commercial geography, often from a regional standpoint. Commercial geography, as ordinarily presented in textbooks, is a study of facts, rather than a presentation of the relationship between economic conditions and physical and economic causes which explain the conditions. Physical and commercial geography are often presented in too great detail to be adequately studied in the time allowed.

The problem of making pupil-teachers efficient in geography involves the presentation of facts and principles in part; but the larger aim of the work must be to give a power of work in the field, and an ability to organize and use from an advanced viewpoint the familiar materials of school geography. The best training does not, therefore, involve a necessary review of the whole elementary field, but a new method of work that will give power and insight. One continent studied so as to bring

out the geographic relations is a better basis for future good work than several continents reviewed hastily, item by item, in a stereotyped manner.

While this systematic order of treatment has many points in its favor, its blind use by the poorly trained teacher presents many dangers, for the emphasis may be put too much on details. Knowledge may be replaced by information and power yield to memory training.

The revivification of school geography, long misunderstood and unappreciated because so largely devoted to detail in memorizing myriads of items, all of questionable permanent value, depends upon the right point of view on the part of the normal school teachers. If the best training in geography is that which gives the students the best knowledge of essentials, and the best power to organize and evaluate details, the method of study to be followed in normal schools is that which will give the best outlook upon the field, and best awaken the mind of the pupil to the opportunities in geography and to its problems.

A teacher skilled in the systematic causal method of presentation from causes to human consequences, can give the needed power through this plan of procedure. But the time granted to geography in many schools must of necessity be too limited to permit a study of even the elements of geography in a systematic way, beginning with the principles and leading to the higher phases of human geography. Further, this plan is so time honored in its elements that pupils are so often completely under the spell of their preconceptions that it is difficult to awaken an intellectual interest through this plan. Geography is a large subject and the emphasis should be on geography and not merely on selected phases of the subject. However alluriug physical geography is, it is only a part of the subject, and should be studied by future elementary teachers not as an end in itself, but as a means to an end. It should be used in the later study of human geography, which occupies most of the courses of study in elementary schools.

It is often desirable to approach geography, therefore, through the analysis of human consequences, rather than by a study of the underlying principles. Such an analytic method is being tried by many teachers with success. It has its difficulties,

however, because of the lack of text-books and laboratory equipment adapted to this method. This plan of procedure involves the problem method which is now much discussed in secondary school science work. Problems can be organized where the work begins with a study of the mathematical and physical phases of geography, but the geographical problems of life are problems of human distribution and relationships, and problems involving a study of the reasons for present social conditions.

With the availability of such cheap and usable atlases as Bartholemew's " School Economic Atlas," or Dierckes' " Schul Atlas," it is easily possible to introduce pupils to many problems of human geography through the maps. These can be followed up by the use of the many excellent texts in physical and commercial geography, especially those which have the modern viewpoint in reference to these phases of the subject. The following problems, among others, may be used in such an introduction. These given are based on Bartholemew's Atlas and have been tested in class with students with little or no special training in geography.

THE DISTRIBUTION OF THE PEOPLE OVER THE WORLD.

1 Where are the most dense populations of the world ?
2 In what continents ? In what portions of these continents ?
3 Where are the largest areas of dense population ?
4 Describe the location of areas of dense population in reference to latitude 40° N; in reference to bordering oceans.
5 What continents have an average sparse population ?
6 What portions of these continents have centers of greater density of population ?

RELATION OF MAN TO VEGETATION REGIONS.

1 (7) What is the natural form of vegetation in regions of dense, of thin, and of sparse population ?
2 (8) What favoring conditions for man do woodland and grass areas offer ?
3 (9) What are the chief occupations of man in forests, woodland and grass areas, steppes and deserts ?

4 What are the principal soil products in areas of dense population ?

5 Where are the regions of greatest commercial development as related to density of population and vegetation ?

6 Where are the regions of least commercial development ?

7 What ocean is the seat of the largest commerce ?

8 What are the occupations of man in the sections of greatest commercial development ?

9 Does commerce depend largely on soil products ?

10 What would you expect to be the chief exports from South America, Africa and Australia ? Why ?

11 Why are the United States and Europe more generally engaged in commerce than Asia and Australia ?

SUMMARY.

1. What are the chief conditions underlying the commercial development of a country ?

(Bring out the evident significance of location, climate, character of vegetation, surface, mineral wealth, routes of transportation and racial distribution as a basis for a later development of commerce and political strength.)

Such an introduction leads to an analysis of the geographical reasons for human conditions over the world in a systematic way. If pupils' minds are once opened to the problems of geography to be seen about them, or to be gained from map and text study and correlation, the problem method can be worked out in the details of physical, economic and regional geography. The field of geography work in normal schools, unfortunately, is not far different in scope from the work desirable in earlier secondary work, because so few normal school pupils have had an adequate high school training in geography. Normal school, secondary school, and college geography work are very intimately related and many of the unsatisfactory phases of normal school geography are due to the previous inadequacy and inefficiency of college and secondary school geography.

If our high school geography were largely causal regional geography, scientifically studied, our high school graduates would enter the normal schools with a knowledge of regional

geography far beyond that gained in the elementary school. They would have a ground work for taking up in the normal schools the advanced study of geography and geography teaching, and would go out prepared to teach elementary school geography more effectively.

If our colleges will turn out teachers for the high schools prepared not only in the basal physical geography, but in higher regional geography, and certain specialized phases of human geography, the future high school teacher will be able to give his pupils geography of immediate value, and basal from the standpoint of the normal and elementary school needs.

When high school graduates enter our normal schools with a good training in regional geography because they have studied in college under teachers properly trained as to what geography for the everyday man and woman should be, our normal schools will be able properly to prepare teachers in elementary schools. High school and normal school teachers of geography are largely college products. The few score of college graduates who go out into our normal and high schools as teachers of geography, are responsible directly or indirectly for the teaching of the eighteen or more millions of school pupils in geography. The improvement of geography teaching is therefore fundamentally dependent on the character of the geography work in our colleges.

College teachers of geography cannot rightfully think only of the training of the future expert in geography. That is the task of the post-graduate school. The college teacher of geography needs to present organized courses in geography that will be a source of inspiration and growth to his pupils, no matter what their future life is to be. The future normal and high school teachers, trained in matter and method, in courses in physical and human geography, will go to their life tasks keen to help in the improvement of geography. They will in turn train pupils to teach this better geography in the elementary schools. Thus the leaven will work downwards and upwards and improvement will follow all along the line.

Our colleges are responding to this opportunity slowly but surely. In many institutions today geography is receiving forceful attention from a broad and scientific viewpoint. The

work of these institutions has already made a deep impress on the normal and secondary school work in several favored localities and though there is a great need for improvement as the conditions brought out herein indicate, there is much to bring satisfaction as the progress of the last decade is viewed in both secondary and normal school geography teaching.

TENDENCIES IN SECONDARY SCHOOL GEOGRAPHY

During the last few years there has been a decided change in public attitude toward geography for secondary schools. The over-emphasis of formal physical geography as such, and its evident unsuitableness as a first or second year subject, together with the increasing importance of commercial and regional geography, have caused a widespread demand for a more humanized geography in secondary schools. Many educational leaders and teachers of geography have felt that formal physical geography, taught either as an informational subject or as a science, was unsatisfactory in that it was impersonal and of less worth as a contribution to the life equipment of most children than some other phase of geography might be. Recognizing the importance of teaching certain parts of physical geography as a basis for later work in geography and related subjects, the demand simultaneously arose in many centers for a modification of secondary school geography.

Many thought that a new demand was placed on the secondary school, so far as geography was concerned, by the decreasing attention given to this subject in the elementary schools, especially in the later grades. Two points of view have animated those who have demanded a new geography in secondary schools. Many believe that geography has a rich and valuable content, that is worth having, not only for itself, but for its use and application in other subjects of the secondary curriculum. Others think of geography as being valuable only for the knowledge of location it gives, and have demanded more geography as they might demand more spelling or common fractions. Many college and normal school teachers have found entering pupils woefully ignorant of the facts and principles of elementary geography, and have endeavored to stimulate secondary geography artificially by making a knowledge of certain facts an essential for admission. A teacher from one of our best known normal schools reports as follows:

"Last fall I gave my class a test on locating states on an outline map. The results were, pupils tested, 74; number of correct papers, 4; average number of mistakes per paper, 18.2." This normal school requires its pupils to pass the following test with an average of 95 per cent before entering the senior class.

UNITED STATES

Locate:
States of the Union.
Lakes:
The Great Lakes, Great Salt Lake.
Rivers:
Potomac, Hudson, Delaware, Mississippi, Missouri, Platte, Arkansas, Red River of the North, Ohio, Tennessee, Colorado, Columbia, Niagara, St. Lawrence, Connecticut, Erie Canal, Sault Ste. Marie Canal.
Mountains:
Mt. Whitney, Mt. Shasta, Mt. Mitchell, Mt. Washington, Appalachian Mts., Adirondacks, White Mts., Catskills, Rocky Mts., Cascades, Sierra Nevada, Coast Range.
Cities:
New York, Chicago, Philadelphia, St. Louis, Boston, Baltimore, Washington, Pittsburg, Cleveland, Buffalo, Rochester, San Francisco, Cincinnati, New Orleans, Detroit, Milwaukee, Newark, Jersey City, Hoboken, Trenton, Louisville, Minneapolis, St. Paul, Providence, Kansas City, Mo., Denver, Duluth, Seattle, Portland, Ore., Los Angeles, Galveston, Mobile, Omaha, Salt Lake City.
Scenic Regions:
Yellowstone National Park, Grand Canyon of Colorado.
Bordering Waters:
Massachusetts Bay, Long Island Sound, New York Bay, Delaware Bay, Chesapeake Bay, Mobile Bay, San Francisco Bay, Puget Sound.
Outlying Territories:
Alaska:—Mt. McKinley.
Yukon River.
Cities of Nome, Sitka, Juneau.
Philippines:—Islands of Luzon and Mindanao.
Manila.
Hawaiian Islands:—Honolulu.
Canal Zone:—Cities of Colon and Panama.
Coaling Stations:—Guam, Wake Island, Samoan Islands.

NORTH AMERICA OUTSIDE THE UNITED STATES

Locate:
Bordering Waters:
Hudson Bay, Gulf of Mexico, Gulf of California, Caribbean Sea, Behring Sea, Panama Canal.

CANADA

Locate:
Provinces:
Quebec, Ontario, Manitoba, British Columbia, Alberta, Saskatchewan.
Rivers:
Mackenzie, Nelson, Fraser, Saskatchewan, Ottawa.
Cities:
Montreal, Quebec, Winnipeg, Vancouver, Prince Rupert, Ottawa.

MEXICO

Locate:
- Cities:
  - Vera Cruz, City of Mexico.

CENTRAL AMERICA

Locate:
- Names of Countries.

EUROPE

Locate:
- Names of Countries.
- Rivers:
  - Mersey, Thames, Clyde, Rhine, Rhone, Seine, Danube, Po, Arno, Tiber, Volga, Elbe.
- Mountains:
  - Alps, Pyrenees, Caucasus, Carpathian, Mt. Blanc.
- Cities:
  - London, Liverpool, Manchester, Birmingham, Glasgow, Edinburgh, Dublin, Belfast, Berlin, Hamburg, Cologne, Dresden, Munich, Paris, Le Havre, Lyons, Marseilles, Brussels, Geneva, Antwerp, Bordeaux, Amsterdam, Rotterdam, The Hague, Copenhagen, Christiania, Stockholm, St. Petersburg, Moscow, Odessa, Vienna, Budapest, Constantinople, Athens, Rome, Florence, Venice, Naples, Genoa, Madrid, Lisbon, Oporto, Salonika.
- Bordering Waters:
  - North Sea, Irish Sea, English Channel, Baltic, White Sea, Bay of Biscay, Mediterranean, Black Sea, Caspian Sea, Adriatic Sea, Aegean Sea, Strait of Bosphorus, Strait of Gibraltar.

ASIA

Locate:
- Countries:
  - Japan, China, Chinese Republic, Mongolia, Manchuria, Tibet, Korea, India, Persia, Arabia, Turkey in Asia, Siberia.
- Mountains:
  - Himalayas.
- Rivers:
  - Hoang Ho, Yang-tse, Ganges, Brahmaputra, Indus, Tigris, Euphrates.
- Bordering Waters:
  - Red Sea, Arabian Sea, Suez Canal, Indian Ocean, Bay of Bengal, China Sea.
- Cities:
  - Tokio, Yokohama, Pekin, Shanghai, Canton, Calcutta, Bombay, Delhi, Jerusalem, Mecca, Singapore.

AFRICA

Locate:
- Countries:
  - Morocco, Algeria, Tunis, Tripoli, Egypt, Congo State, Union of South Africa.
- Rivers:
  - Nile, Congo, Zambezi.
- Cities:
  - Algiers, Alexandria, Cairo, Cape Town, Port Said, Johannesburg, Kimberley.
- Cape of Good Hope.
- Sahara Desert.

SOUTH AMERICA

Locate:
Countries:
Brazil, Argentina, Chili, Peru, Colombia, Venezuela.
Mountains:
Andes.
Rivers:
Orinoco, Amazon, La Plata.
Cities:
Buenos Aires, Rio de Janeiro, Valparaiso.
Cape Horn.

AUSTRALIA

Locate:
Victoria, New South Wales, Queensland, Western Australia, Melbourne, Sydney.

ISLANDS

Locate:
New Zealand, East Indies, West Indies, Cuba, Jamaica, Porto Rico, Bermudas, Newfoundland, Trinidad.

Obviously the weakness of pupils' knowledge of geography on graduation from secondary schools cannot all be laid to poor or inadequate teaching of geography in the elementary schools, for at least five and six years elapse between the closing of school geography in the seventh or sixth grade and high school graduation. Such lack of knowledge of essential every-day facts cannot be any greater for pupils entering the higher educational institutions than it is for pupils who leave the secondary school for business life. High school geography needs, therefore, to include some training in regional geography not of the type usually found in grade schools, but something richer, better and more scientific than any work that can be done in the grades. This is the opportunity that many have recognized and worked for, and it is work of this new type that is coming into many secondary schools in varied forms. The movement has progressed rapidly in certain sections and the modern changes that have been incorporated in our texts and courses of study have been largely based on two committee reports which are essentially as true now as when written.

At the annual meeting of the Association of American Geographers in 1908, an evening was devoted to the discussion of secondary school geography, in which discussion practically all the leaders in geographical education took part. Though there was some lack of unanimity of opinion in reference to certain

minor points, there was very general agreement in reference to the larger propositions of the following syllabus which served as a basis of discussion.

SYLLABUS

1. Present Character of Secondary School Geography: Largely physical geography, with or without laboratory work; some commercial geography causally taught; some commercial geography taught in an informational way.
2. Modern Physical Geography.
   a. Generally includes Earth in Space, Atmosphere, Lands, Oceans, and some treatment of isolated life responses or of larger life conditions.
   b. In better secondary and normal schools includes much laboratory work on Earth in Space, Lands and Atmosphere. Much of this is forced in character and a good deal of it is not geographic in nature.
   c. Two Groups of Courses.
      (1) Systematic, following outline like College Entrance Examination Board Requirements and most texts.
      (2) Informational, including a large number of facts and principles unrelated to systematic development of the subject.
      (3) Advantages of the Present Course.
         (a) Systematic and capable of being taught to large classes in a more or less mechanical way.
         (b) Can be made definite and laboratory tasks can readily be assigned.
         (c) Supply of well trained teachers, good texts and laboratory guides constantly increasing.
         (d) Gives excellent training in scientific study of problems large in scope and requiring different form of study from most problems taught through experiment or observation with or without microscope.
         (e) Readily prepares for college entrance in a subject that can now be studied in a more advanced way in many colleges and normal schools.
         (f) College and secondary school work closely united.
         (g) Has aroused interest in study of local physical geography.
      (4) Disadvantages.
         (a) Over-systematic and often unreal to pupils. Deals with subject as if all students were preparing to be geographers or to enter colleges giving advanced work in systematic study of land forms.
         (b) Does not meet real need of most pupils. Pupils entering college are criticised for lack of knowledge of geography of the world. Those not going to college generally get no study of any areas of the world after 7th year in grammar school.
         (c) Point of view in study of lands incapable of being personally applied to pupils over large areas.
         (d) Too advanced and too detailed for most pupils. Detailed classification of land forms requires knowledge of structural geology, and the ability to interpret solids for which pupils are not prepared.
         (e) Laboratory problems deal with the representations of things and not with things. Form of representation even of contours, hard for inexperienced person readily to follow.
         (f) Similar courses in Normal Schools do not give students preparation to teach in elementary schools.

(g) Physical features not located are studied as puzzles or tasks. Work does not arouse interest. Pupils may recite glibly but have no usable knowledge of the subject.

(5) Needs of the Pupils in Secondary Schools in Reference to Geography.
- (a) Course that will best prepare for after-life within or out of college.
- (b) Phase of geography most used will be regional geography in some form.
- (c) Work should not only be informational but personally useful, and yet systematically presented so as to give training in scientific study of the subject.
- (d) Regional geography necessary as a basis for work in history, in ancient or modern literature, in economics, in commerce, in fact, in any topic dealing with distribution of phenomena.
- (e) If regional geography be not studied in secondary schools it will never be secured except by those few pupils who go on to those colleges where regional work is being given.
- (f) Work should be geographically sound, scientifically presented, but not necessarily as it would be to a group of pupils who were preparing for advanced scientific geography work.
- (g) Present popular interest is in commercial geography because of its practical value.

(6) Content of most valuable High School Work.
- (a) Should deal most largely with regions—say, United States and Western Europe.
- (b) Regional study of High School should be more advanced and more scientific than any work possible in elementary schools.
- (c) Work should begin with study of those phases of physical geography which are necessary as a basis for systematic, causal, regional geography. Physical geography is not, therefore, an end in itself, but a means to an end.
- (d) Work should find its application and use in scientific causal study of political and commercial geography, in geography of life, in a large way.
- (e) Such a course would be a compound of selected phases of present physical geography and of principles of commercial geography, with special study of selected regions as wholes. Course should not be a collection of scraps, but a united, well knit whole.
- (f) Should be so taught that any pupils can study any other region alone in similar scientific way.
- (g) Advantages gained from laboratory study of present physical geography should not in any way be sacrificed. Laboratory work should be large factor in course, to include study of earth in space, elements of map reading, larger features of climate, larger land forms, as plains, plateaus, volcanoes, sea shores, mountains, etc., ocean currents and waves as related to harbors and trade routes; general maps showing distribution of population, nationalities, products, industries, etc.

(h) Laboratory work should include study of special maps such as those in Dierck's or Sydow Wagner's Schulatlas, as much as, or more than, weather maps and United States Geological Survey topographical maps. Should include training in atlas work, in reference work and in field work.

(i) Such a course would best, perhaps, be divided into parts.

(j) (*1*) Physical geography in which only those phases of the subject should be included which later will be needed, and those studied so as to suggest their application, and

(*2*) Regional geography in which given regions are studied systematically from larger topics of position, climate, surface, etc., to a climax, in economic and social phases.

(k) Such a course can be as "disciplinary" as present work; is more needed as a preparation for life in school or out; is more personal and will meet the approval of superintendents and parents because more practical.

(7) Possibility of such a course.

(a) Inquiry has shown general dissatisfaction with present work among geographers, geography teachers, superintendents, principals, and teachers.

(b) Time is ripe for a change.

(c) Such a change can be more readily accomplished today than was the change to present physical geography because—

(*1*) Some colleges and some normal schools are already giving such courses and are preparing teachers for such work. Supply of teachers will be assured.

(*2*) Value of laboratory and field study has been proved and teachers will not go back to merely informational cram work as of old.

(*3*) Supply of general and special maps and atlases is good and constantly increasing.

(*4*) Chief lack is proper text-books more advanced than elementary school texts, less inclusive than the encyclopedia reference books like Mill's International and Chisholm's Handbook. This need will undoubtedly promptly be met by publishers as soon as change is seen to be imminent.

8. General Conclusion.

Such a combined course, or one on similar lines, would retain all the advantages gained from the modern study of physical geography, would avoid many of the difficulties, would be more generally adapted to pupils' needs, would be equally adapted to college requirements from the standpoint of training secured, would give a better foundation for work in college of general study in related fields, would allow for causal study of commercial conditions and relations, would appeal to the public, and can at once be undertaken by trained teachers.

In 1908 a committee was appointed by the National Education Association and one by the Association of American Geographers to consider and report upon the subject of Secon-

dary School Geography. The first Committee reported in 1908 the following recommendations:

1. Geography, touching as it does the daily life of every individual at so many points, should be, in some form, a required subject in all secondary schools.
2. The subject should be pursued for not less than one year.
3. The subject should be presented in the first year of the High School.
4. There should be at least five recitations a week.
5. About one-fourth of the total time should be devoted to laboratory and field work. This should, by no means, be confined to the study of physical geography. Much laboratory work and some excursions should be undertaken in connection with the commercial phases of the subject, and there should be carefully planned exercises based upon maps and models.

We recommend that about one half year be devoted to the larger topics of physical geography, with the human side made more prominent than at present, and that the remainder of the year be given to a study of North America and Europe. Such a course would give our students some considerable knowledge of the geography of the most important countries of the world, and incidentally much useful information as applied to other areas, would be required.

The chief difficulties that stand in the way of putting such a course into operation are two: first, time honored custom; and second, the lack of text-books that meet the requirements.

We believe that careful consideration of the subject from all points of view will remove the first, while the publishers will provide us with the necessary texts almost as soon as we declare ourselves ready for them. In the meantime, the first part of the course can be carried on by means of selected portions of our physical and commercial geographies, numerous government publications and periodical literature.

The Second Committee reported as follows:

Opinions from widely scattered regions show the necessity of an evolution, but not a revolution, in our secondary school geography. Your committee is a unit in its conviction that the present " disciplinary " quality of the work must be maintained and that the satisfactory results from rational laboratory work must in no way be lessened or any change of emphasis be given to different phases of the subject. Several members of the committee fear that the possibility of a greater emphasis of human geography is a distant one because of the probable lack of trained teachers. On the other hand, it should be noted that work of the kind necessary for future high school teachers is

now being given in many of the normal schools which, outside the east, frequently prepare pupils for secondary as well as elementary work, and that the leading universities are now giving regional as well as physical geography courses to large and constantly increasing classes. The teachers prepared for the new work are greater in number than were the prepared teachers for the new type of physical geography fifteen years ago. To-day not one-half, perhaps not one-fourth, of the teachers now conducting classes in physical geography have had any special training, and their preparation for one type of work is as good as that for another. They are victims of text-books and courses of study.

Your committee is also a unit in believing that physical geography should not be displaced but modified and that an understanding of the essentials of physical geography is necessary as a preparation for any regional study, whether that study be a general study of typical areas and "responses," or whether it be a study of selected regions from a causal standpoint—that is, after the order of treatment followed by the better teachers in the upper grades of the elementary schools, but much more deeply and scientifically.

Your committee further hopes that it may be possible in the near future to have a second year of geography work following a course in humanized physical geography—which second year should be acceptable for college entrance at the same time that it is of practical, immediate value to the pupils in their school work, and as a preparation for after-school life, which will come to most pupils not later than the end of the second year in the high school. This hope is, however, an ideal which may be long deferred. The demand of the hour is for the best course in geography—not necessarily physical geography—for pupils in the first or second year in the high school.

It is a practical problem that we must meet, and your committee, therefore, recommends that we suggest a course of study that shall outline the essentials in physical geography and be followed by a course in either.

a. Commercial or industrial geography, or

b. Regional geography of the United States and Western Europe, or

c. A study of selected physical regions of the world, with an emphasis of the life relation.

Your committee recommends that the course to follow the preliminary course in physical geography be regional study of the United States and Western Europe, culminating in the commercial status of these regions in the world's history. The treatment of these regions should be by physical and climatic divisions, a form of treatment which is well outlined in the

chapters devoted to the British Isles in Herbertson's Senior Geography.

Although your committee believes such a course to be the most practical and valuable, it does not feel that its recommendations in this regard should be so definite as to preclude human geography of the other types listed above for those schools or teachers who are prepared to do the other kinds better and more advantageously. Our recommendation is that this work should be based on the elements of physical geography, and that the principles of physical geography should be constantly applied in the interpretation and study of the selected regions or phases of human geography.

To summarize: The problem before us is, given one year of time available for geography in the first or second year of the high school,

1. What is the best content of such a course from the standpoint of the present and future needs of pupils ?
2. How large a part of this time should be physical geography ?
3. What is the point of view from which the essentials should be selected, and what is the object for which these essentials are to be taught ?

The Relation of Geography to the Other Secondary School Sciences

The problem that confronts us in working out the best course in secondary school geography along the lines of the recommendations quoted, involves many elements. The decrease in attention given to the earth sciences, as indicated by the table below, puts a greater burden upon geography, the most favored and general of this group of sciences.

Number of Students in Certain Courses in Public and Private High School

(From the Report of the Commissioner of Education, 1911)

Public High Schools

	1895		1900		1905		1910	
	No.	%	No.	%	No.	%	No.	%
Astronomy ..	16,670	4.79	14,235	2.78	8,307	1.22	3,915	.53
Geology.....	17,488	5.00	18,743	3.61	15,914	2.34	8,538	1.16
Physical Geography.	83,642	23.89	121,335	23.37	146,275	21.52	142,948	19.34

Private High Schools

Astronomy ..	7,920	6.69	7,160	6.46	5,200	4.85	3,301	4.20
Geology.....	8,378	7.08	6,557	5.91	4,682	4.36	2,713	3.46
Physical Geography.	21,482	18.15	22,800	20.57	19,356	18.05	13,552	17.26

The character of the work to be given must depend in large measure upon the year in which geography is to be offered. In many localities, as is indicated by the following table from the Report for 1912, Education Department, State of New York, geography is primarily a second year subject.

DISTRIBUTION OF SCIENCES IN THE ONE, TWO, THREE AND FOUR YEAR HIGH SCHOOLS IN NEW YORK STATE

	1st year	*2nd year*	*3rd year*	*4th year*
Botany	162	0	29	35
Zoology	88	0	28	33
Biology	485	3	0	0
Physiology	24	8	16	141
Physics	0	6	569	107
Chemistry	0	23	86	247
Physical Geography	1	197	39	42
Commercial Geography	18	0	43	39

Or to summarize, the biological sciences in New York State come largely in the first year, geography in the second year, physics in the third year, and chemistry in the fourth year. This means that the physical geography offering consists of a general course in the second year in the larger number of schools offering the subject, and a special course for college entrance in the later years following the lines of the modern texts and laboratory manuals.

The tendency to make geography a second year subject in secondary schools has been recently increased by the fact that "General Science" is being adopted for the first year science work.

A recent study of the offering in geography in the secondary schools of forty of the leading cities of the country gives the following distribution according to years of the course.

Year	Physical Geography	Commercial and Industrial Geography	Geology
1	20	8	0
2	13	18	1
3	2	7	0
4	8	11	8

The Committee of the National Education Association on the Articulation of School and College work has considered, as a preliminary step to more complete formulation of details, the question of the relation of sciences in high schools—especially high schools not principally for training pupils for college en-

trance examinations. They have placed general science in the first year, followed by geography in the second year. The general practice of the country seems to be in accord with this thought.

So far as geography is concerned, then our problem is to outline a course for the second or first years of a four-year high school curriculum; for in the relatively small number of schools where geography is included in the later years of the course, it is highly specialized and standardized.

A course of study for the earlier years, it is generally agreed, should be humanized in its viewpoint, and practical in its applications. If the ultimate aim of the course is to be the study of regional or commercial geography, the course should be organized as a unit for the year, where possible. Available texts and aids make it more generally practicable to emphasize the elements of physical geography in the first part of the course.

The first and most difficult step in reforming secondary school geography is to organize a basal half-year course in the elements of physical geography, largely to be taught through maps and books, which will lay a good foundation for later regional or commercial geography.

Any such half-year course must, of necessity, be unsatisfactory to the enthusiast for physical geography, because in such a course physical geography must be taught as a means to an end and not as an end in itself. Certain portions, interesting and necessary from one point of view, must be sacrificed for the sake of the quality and unity of the whole. Further, in actual teaching, some of the application of the physical facts in the interpretation of human affairs should be brought out in the study of the facts themselves, so as to show the practical and personal value of the material. The elements of physical geography taught with no reference to the life responses are dry and often meaningless except in the hands of a teacher enthusiast. Physical geography taught from the opposite point of view is one of the most fascinating of secondary school sciences. The modern teachers of physics and biology have recognized the value of making their favorite subjects "practical" for many years, and have profited from attempting this newer kind of high school science. The teacher of physical geography is just beginning to outline work of a similar type.

A HALF-YEAR COURSE IN THE ELEMENTS OF PHYSICAL GEOGRAPHY AND ITS APPLICATIONS

The following course of study is presented here as a contribution to the cause. Seemingly stripped to the shrouds, as it were, the course is a unit in itself, but it is a workable unit. Many sections of the ordinary course are here omitted with the thought that they will be introduced more effectively in the later regional or commercial work.

The Elements of Physical Geography with some Applications in Life

The Earth as a whole.
- The relations in space of the earth, moon and sun. Full moon, new moon.
- Shape and size.
- " People have sailed around the earth."
  - Proof: Circular shadow, measurement of arc.
- Significance in human occupations and daily life.
  - Size: Slowness of development of earth knowledge.
    Commercial intercourse today.
  - Shape: Gravity.
    Uniform weights and measures.
    Bills of lading and cargoes.
    Energy vs. work in all parts of the world densely populated.
    Up, down, level.
- Earth motions.
  - Rotation and inclination of axis.
    - Alternation of daylight and darkness, except about poles at certain seasons.
    - Direction east and west; North Star; deflection of winds.
    - Physiological response of plants and animals.
    - Pole, equator.

Measurement of time.
Longitude, degrees of longitude, international date line.
Revolution.
Variation in length of day and night.
Variation of seasons, significance in agricultural and other occupations.
Tropics and circles; zones of sunlight.
Latitude, degrees of.
Maps and their use.
Meridians and parallels, scales and projections, township and section lines.

The Atmosphere.
Composition, weight, height.
Offices of the atmosphere.
Relation of oxygen, nitrogen, and carbon dioxide to plants and animals.
The elements of weather and climate.
Seasonal and annual conditions of temperature over land and sea, and over North America.
Frosts, length of the growing season.
Winds, their cause, relation of winds to temperature, seasonal winds in the United States. The great wind systems and the chief modifications. Sea breezes. Mountain and valley winds.
Humidity, relative. Relation to winds and temperature, causes for variation, significance in daily life, humidity and plants and animals.

Rainfall.
Relations to humidity, causes, relation to winds, to larger surface features, distribution of arid, semi-arid and humid regions.
Importance of seasonal distribution of rainfall including snowfall, as related to industries. Illustrations from several sections of the United States.

Storms.
Temperate latitude cyclones and anticyclones. Character and general paths. Seasonal weather in home region, relation

to industries, especially agriculture, and transportation. Cold and hot waves. Weather forecasting.

Climate.

Climate of the tropics and trade wind belts as related to plant and animal life, industries and civilization.

Climate of the temperate regions in review with particular emphasis of the growing season.

Broad distribution of countries according to climate.

The Lands.

The land as home of man. Dependence of man on soils and water supply.

Soils.

Importance of soils. Soil making briefly.

Physical and chemical conditions of soils as related to plants.

Maintaining tilth and fertility.

Character of local soils as related to crops and distribution of population.

Reasons for variation of soil character.

Relation of soil use to climate and ground water.

Broad distribution of soils in United States.

Water Supply.

Ground water, evaporation and rainfall.

Importance of ground water. Seasonal variation in height of water-table. Relation to slopes. Relation to plants, rivers and water supply.

Artesian water, irrigation, dry farming (briefly).

Rivers and River Valleys.

Work of running water briefly.

Types of river valleys—young, mature, old, drowned.

Lakes and waterfalls and their significance.

Valleys as routes of travel and centers of occupation and industry.

Relation of cities to the following points in river valleys—mouth, head of tide, head of navigation, head of lake, foot of lake, falls, junction of tributaries, bluffs, gaps, portages.

Rivers as boundaries.
Special study of the larger features of the Mississippi Valley, the Hudson Valley, and the Sacramento—San Joaquin Valley, as related to industries, commerce, distribution, of population, etc., bringing out the relations to climate and surface features.

The Larger Land Forms.
Plains, character, slopes, significance in present and past.
Alluvial—small, local, large. semi-continental. Relation to delta and bluffs. Favorable and unfavorable conditions.
Coastal—origin, relation to shore features, surface and soils.
Wide and well drained; narrow, indented.
Significance of inner margin. Fall line in United States.
Interior plains.
Size and significance. Effects of climatic situation on occupations and development.
Note.—Defer lake, lava, and glacial plains to later regional work.
Plateaus.
Surface and climate features. River valleys.
Occupations and life conditions.
Mountains.
Mountains, ranges, systems, peaks and passes.
Significance of height, direction, and extent.
Relation to climate, rainfall, and rivers.
Mountains in relation to plants, to transportation, to industries.
Mountains and plains.

The Ocean.
The extent and continuity of the ocean.
Ocean as a highway and source of food supply. Relation to climate of bordering lands.
Fog areas, fishing grounds, cable paths, coaling stations.
Harbors.
Essentials of a good harbor. Types of harbors with examples.
The distribution of harbors in the United States as related to regular and irregular shores, estuaries, fiords, lagoons.

Accessibility of harbors as related to waves and tides.
Waves, their form and size, motion and relation to wind.
Tides, occurrence, interval, relation to moon and sun.
The work of the tides, tidal currents, high and low water, ebb tide, flood tide.
Ocean currents.
General scheme of the ocean currents.
Relation to winds.
Monsoon currents in Indian Ocean.
Influence of currents on atmospheric temperatures and moisture.
Special currents of significance.
Great ocean routes as related to winds, currents and plains.

The Distribution of Plants.
Larger world areas including temperate forest and grass lands, tropical forests and savannas, steppes, and deserts.
The distribution of population and occupations over the world as related to the larger plant regions.
United States plant regions, as evergreen forests, mixed forests, grazing and dairying areas, mixed farming areas, cotton, cereal and subtropical fruit areas.

REGIONAL GEOGRAPHY IN SECONDARY SCHOOLS

The type of geography of most value for the usual secondary school varies with the locality, with the character of the school and in accord with the future life needs of the pupils. It is doubtful if a course in commercial geography devoted primarily to the distribution of industries and products and to their exchange is adapted to the needs of many schools. Such courses are likely to be far too informational in type and not to give the outlook on the world relations and economic opportunities that are a better basis for future growth. A study of economic and commercial conditions over the world and of our own country from a regional standpoint has more value both from the standpoint of immediate and ultimate use. But even this fails in part unless the economic and social relationships of the various parts of our country are brought out and the pupil sees, not each area separately, but in its setting as related to the larger country of which it is a contributing and dependent part.

Regional geography is a larger and more significant subject than commercial and industrial geography. Regional geography ought to be a causal study of unit areas, including the physical features and the life conditions found therein.

The distribution of people and industries in any region is directly or indirectly in accordance with four large factors: plant regions, climate, physical features and soil. The interrelations of these factors are so complicated that it is difficult to combine them so as to draw a composite map of natural regions on a scale suitable for detailed work. The larger factors are vegetation and climate, which together form a setting against which to study physical divisions. The composite vegetation and climatic regions are sometimes considered as natural regions (Herbertson) or provinces (Dryer). Hence before entering upon the detailed consideration of either of the several unit areas that may be used as a starting point in the study of the regional

geography of the United States, it is desirable to summarize briefly the general physical conditions of the country in accord with the following suggestions. Such a summary will be a means of reviewing the generalizations of the earlier part of the work and give a setting for the later work.

Climatic Regions of the United States.

Cool Temperate.

East Coastal—seasonal distribution of rainfall, from coast westward; varying length of the growing season; seasonal temperatures; relation to occupations, to natural vegetation and to the distribution of population.

West Coastal—distribution of rainfall; seasonal variation of temperatures; relation to natural vegetation and occupations.

Interior Highlands and Valleys—seasonal rainfall and temperature; relation to natural vegetation and occupations.

Warm Temperate.

East Coastal—summer and winter temperatures and rainfall; relation to natural vegetation and crops.

West Coastal—seasonal rainfall and temperatures; relation to natural vegetation and crops. Modifications of climate due to influence of mountains.

The Physical Regions of the United States.

The extent, broad physical characteristics, relative location, and general relation to vegetation and climatic areas of the following physical divisions of the United States: New England; Atlantic and Gulf Coastal Plain and Piedmont Belt; Appalachian Region (including Appalachian Mountains, Great Valley and Ridges, and Plateau); Prairies; Great Plains; Rocky Mountains; Columbia Plateau; Colorado Plateau; Basin Ranges, Pacific Ranges and Valley.

The Soil Provinces of the United States, as related to physical divisions and climate, according to Plate II, Bulletin **6**, Bureau of Soils, U. S. Department of Agriculture.

The Economic Vegetation Regions of the United States as related to natural vegetation, physical regions, climate and soil as follows: lumbering areas (evergreen forests, mixed forests) grazing and dairying areas; mixed farming areas; cotton, sugar and rice area; cereal area; sub-tropical fruit areas.

The life conditions include the distribution and character of the people, their work, their relations to other communities, their facilities for economic and commercial progress, something of the relation between the geography and history seen therein and the probable future conditions. Regional geography should not merely be facts; it should involve more the study of relationships local and remote. It should not be wholly from a text but largely from maps and through the presentation of problems that the pupil will systematically endeavor to work out.

For instance, the study of New England would naturally center around the study of two problems: the reason for the development of manufacturing in New England and its consequences socially and economically; and second, the commercial relations of New England to the other parts of the country as areas of supply of food or raw materials and as markets for the products of New England. Incidental to such a study should be brought in the change in the character of the New England industries and the distribution of population with the growth of cities. Through such a series of problems and sub-problems it is easily possible to study the essential geographical conditions of any area. Principles used in the earlier work can be applied, tested and used, and good training can be given in the methods of analysis involved in most geographic study.

To stop with such a series of analyses would be to give the impression that geography is valuable only in the study of existing conditions. The tendencies of the times in New England, because of the conditions of location, of physical and economic conditions, should be touched upon as well. What is to be the future of this area is equally interesting. The modern movement from extensive to intensive agriculture, the development of dairying and truck farming and similar movements, now in their infancy, are signs of the times that suggest problems to be left in the pupils' minds as worth attention in the future. The ability to

interpret new conditions as they arise is the most valuable result that can come from the study of modern geography and should be constantly kept in mind.

The following outline presents a method of approaching the regional study of the United States through a study of the economic and social conditions. These are the phases of geography that are the most interesting and generally valuable.

The Larger Problems of New England

1. The Reasons for the Development of Manufacturing in New England.
2. The Commercial Relations of New England.

METHOD OF STUDY OF PROBLEM 1

What are the conditions necessary for successful manufacturing? (Bring out the significance of raw materials, power, labor, markets, foods.)

What were the occupations in the early history of New England? The significance of agriculture, lumbering, and fishing, with reasons.

What conditions were favorable and unfavorable for agriculture? (Bring out the character of the surface and climate, the soil and the crops of the early days.)

How were people distributed in the early days? Small towns and villages.

What were the needs of the people in reference to food and clothing?

How were these needs supplied? Development of home industries.

What were the raw materials of these industries? Where and how secured?

Influence of long winters on manufacturing when labor was freed from farm work.

What was the chief source of power?

Why did the rivers and lakes aid the development of small factories?

What was the effect of steam on transportation of raw materials and fuel?

The effect as seen in the development of large factories and the concentration of population in large cities.

How were the needs of raw materials met? Cotton, wool, leather, lumber, etc.

What are the needs of a large manufacturing community as to the essentials of life?

How are these needs met?

What foods can be brought from a distance? What must be secured largely from near at hand?

Why have dairying and truck farming developed in recent years?

What areas are still devoted to special crops? Why?

Why has paper making developed as an important manufacturing industry?

What are the leading cities of New England? Where are they located?

Are the largest cities only known for their manufacturing?

What other forms of business are important in many cities? Why?

METHOD OF STUDY OF PROBLEM 2

Where must a manufacturing community sell its products?

What favorable conditions for commerce has New England?

What are the chief ports of New England for foreign commerce?

What manufacturing cities naturally center on Boston? On New York?

Why is southern New England well situated for domestic water commerce?

What disadvantages do the northern coast cities have for water commerce?

What are the chief materials brought into New England by water? Coal, cotton, leather, wool. Where from?

What products naturally come by land? From where? Iron, food, manufactures from inland sections.

With what sections of our country do we naturally have the greatest land commerce? Why? Relative advantages of New York and Boston from this standpoint.

The products of New England needed in the rest of the country.

Is New England as independent an area as it once was?

It is very easy, however, in work of this kind, to overlook some of the permanent essentials unless such a plan is checked up by a systematic organization of the larger geographical factors that should be brought out through such an analytical study. This organization should be in the mind of the teacher and should guide her in bringing out the underlying conditions that help to explain the present conditions. It may be presented to the pupil as a final summary of the work, if thought desirable, but should not be presented at the opening of the work unless the teacher is able to combat the combined influence of the plan and the text, both of which may be followed without the provoking of thought.

The following outline presents the most significant facts of New England geography, adapted to pupils of early secondary schools. A comparison of this with the plan suggested for study will show that the content of each is closely similar. The advantage of the plan for study is that it is centered about life problems and permits the approach to be made through the study of problems. The problems are points of departure and are brought in for illustrative purposes. The purpose of the "check list" is to give a reference base that will prevent too much wandering afield and too great emphasis of details.

The Larger Elements in New England Geography

Area, relative size.

Significance of location in relation to ocean, Canada and rest of country.

Climate.

- Effect of east coastal position, as seen in relation to storm paths and character of storms, seasonal temperatures and rainfall, length of growing season.
- Effect of climate on character of occupations, on distribution of crops, on lumbering, on water supply for manufacturing.

Surface.

- Elevated upland, mountain groups, and coastal and valley lowlands.
- Effect of depth and character of river valleys on transportation, distribution of population and industries.
- Mountains as scenic regions.

Glaciation (including a brief study of glaciation in general).
Effect on surface, drainage and soils.
Upland and valley soils as related to population and industries, past and present.

Drainage.
Significance of streams in early history. Carrying places. Canoeing.
Falls and lakes as related to summer resorts, power, water supply, local climate, winter occupations.
Swamps, their use and extent.

Shore Line.
Character of shore line. Estuaries and fiords.
Relation to transportation, commerce, fishing and summer resorts.
Decline in use of small harbors for commerce. Effects on cities.
Oysters, scallops, shore and deep sea fishing as related to shore.
Wooden ship building and whale fishing.

Soils.
General character of the glacial soils.
Relation to extensive and intensive agriculture.

Occupations.
Agriculture.
Influence of soils, climate, surface, and markets on the character of agriculture. Highlands and lowlands contrasted.
Special crops and their distribution.
Reasons for change from cereals to fruit, vegetables and dairy products.

Lumbering.
Distribution as related to climate, surface and forests. Character of present lumbering. Paper pulp. Reason for decrease in significance of lumbering in New England. Relation to ship-building and wooden ware.

Quarrying.
Distribution of granite, marble, slate and sandstone quarries.
Relation of granite industry to water transportation.
Significance of marble and slate quarrying.
Changing requirements for building materials. Importance of road materials.

Manufacturing.

Reasons for development of manufacturing. Sources of power and raw materials.

Change from home to factory industries. Influence of heredity on labor supply.

Significance of water power and reasons therefor. Localization of cotton manufacturing.

The significance of leather goods, wooden ware, woolens, silver and brass and reasons therefor.

The available markets and the dependence of New England on the rest of the country for food and raw materials.

The effect of manufacturing on agriculture and distribution of population.

Fishing.

The reasons for the growth and significance of fishing.

Character of fishing and its localization.

The early fishing and the relation to the ship-building industry.

Summary.

The distribution of population; the relative significance of agriculture, manufacturing, lumbering and fishing as compared with the past.

The New Englander in the development of the West.

The general distribution and the localization of industries in New England.

The commercial relations of New England, New York and neighboring states.

The probable agricultural and manufacturing future.

The Atlantic and Gulf Plain

1. The Reasons for the Prominence of Agriculture in the Region.

2. The Present Distribution of Commerce on the Atlantic and Gulf Coasts.

Method of problem 1

What are the staple crops of this area ? How do they compare with the crops raised in Colonial days ? What is the leading crop of the section ? Why is it so important ?

What conditions have favored the development of agriculture? What is the character of the soils? Where are they the richest? How have the surface features favored and hindered the development of agriculture?

Will agriculture prosper where soils and surface features are favorable? What other conditions must be supplied? What is the length and character of the growing season here? How long a season is required for cotton, for sugar, and rice? How are these three crops distributed in the Southern States?

What other crops must be raised to meet local needs? What crops can be sold in a local market? What crops must be sent long distances?

What conditions favor truck farming and fruit raising? Where can these products be sold? At what seasons? Why?

Why is manufacturing increasing in this section? How do the agricultural conditions favor the development of manufacturing? Where are the chief manufacturing sections? What cities are railroad centers? Why?

Why has manufacturing been longer established in the Northern States than in the Southern States?

Why was the National Capital located in this section? Why were the southern colonies so prominent politically in the early days of the country's history?

METHOD OF PROBLEM 2

What are the leading ports of the United States? What ports are most prominent for their imports? For their exports?

How many of the leading ports are located in this area? What condition must a port have for commerce? Bring out ease of access by sea and by land, protection of harbor from winds and waves, necessity of good landing facilities, deep and straight channel, good anchorage ground.

Where are the best harbors? Why are the commercial cities at the fall-line so favorably situated? What advantages and disadvantages have Galveston and New Orleans as ports? Why are these ports so important in foreign commerce? With

what countries do they carry on their trade? Why are the ports of the southern Atlantic Coast more engaged in domestic commerce? Why? How would their exports vary with the season?

What are the chief imports of the southern states? Of the northern states? With what portions of the country do the southern and northern states carry on commerce by land? What products from the interior do the northern states need but which the southern states do not need? Why?

How many large cities in this section are not engaged in ocean commerce? What are their industries? Why do the railroads run in general in a northeast-southwest direction?

Summary.

Why was the early commerce of this section not concentrated in large cities as it is now? What will be the effect of the opening of the Panama Canal upon the commerce and industries of the southern states?

The Larger Geographic Conditions Summarized

The extent of the Atlantic and Gulf Plain. General comparison of the Coastal Plain and the Piedmont Belt.

Climate.

The significance of position in reference to storms and seasonal weather. The varying length of the growing season. The distribution of rainfall areally and by seasons.

The effect of climate on the distribution of crops, on occupations, on the character of the labor employed and on the needs of the people for food and shelter.

Surface and Soils.

The larger surface features and the soil distribution in the two sections. The lowlands bordering the coast, the alluvial plains.

The relation of the section to the bordering mountains. Effect of the mountains on the occupation of the section and on ease of communication with the central portion of the continent.

LIBRARY OF THE UNIVERSITY

Drainage.

The length and character of the streams. The navigability of the streams in the north and the south. The significance of the fall-line and the growth of the fall-line cities. The absence of lakes. The use of the streams for manufacturing and the modern development of electricity. The significance of the Mississippi River and Valley. Brief account of the floods, the forests and soil conditions and of the river as a commerce route.

Shore Line.

Comparison of the northern and southern shore line. The distribution of harbors as related to shore line. The relation of ports to river valleys giving access to the interior of the country. The estuaries in relation to fishing and commerce. The relative advantage of deep and shallow bays as harbors. The shore line of Texas and the harbor of Galveston.

Occupations:

Agriculture.

Influence of soils, climate, surface features and markets on the character of the crops in various sections. Special study of the tobacco, truck farming, fruit, cotton, rice and sugar sections with reasons for their distribution. Comparison of the crops of the Coastal Plain with those of the Piedmont Belt. The influence of the large cities of the North on the distribution of crops in this region.

Lumbering and Mineral Products.

The distribution of forests. The reasons for their exploitation.

The character of the forest products. The ports of shipment.

The local use of the lumber and other forest products.

The distribution and importance of the phosphates, sands and clays.

The relation of the mineral products to agriculture and manufacturing.

Manufacturing.

The sources of power available.

The raw materials and available labor supply.

The distribution and character of manufacturing.

Conditions favoring the development of the industry.

The leading cities and the reasons for their significance.

Commercial Relations.

The several ports and their trade. The distribution of the foreign and domestic commerce. The West Indian trade.

The significance of the Mississippi River as a trade route.

Summary.

The present character of the industries as compared with those of the earlier days.

The significance of the region historically.

The relation of the Atlantic Plain section to the Appalachians.

The probable future development of manufacturing, and commerce.

The Appalachian Region

1. What Great Industries Depend on the Products of the Region?

2. Explain the Location of the Railroads in the Appalachian Region.

METHOD OF PROBLEM 1

What are the natural products of the Appalachian Mountains? Of the Great Valley? Of the Alleghany and Cumberland Plateaus?

Where are the conditions for agriculture most favorable? What are the crops of the Great Valley? Of the Plateau? How have the agricultural opportunities of the Great Valley influenced the development and settlement of the region?

Of what value are the forests of the section? Why is it considered desirable to protect and develop the forests? How will the forests of this section aid the industries of the Atlantic Plain? What industries have been developed within the region because of the forests? Where are these industries located, and why?

What sections of this region contain the richest coal and iron? Which is the most valuable, and why? What industries depend to the largest extent on the use of coal? Where are these industries located? How is the coal carried to them?

What industries in this section depend on the local use of the coal? What large cities in this section are noted for their

manufactures? Where are they found? Is any other source of power than coal available in the region? Is it being developed? How?

How is our foreign commerce related to the coal supplies of this section? Why has the coal of the southern section not been developed to the extent that it has been in the north? Is there any reason to believe that the coal and the iron of the southern section will some day be developed to a greater extent? Why? In what particular areas?

What portions of this section are as yet thinly populated? Why? Where would one expect the population to increase most rapidly? Why?

METHOD OF PROBLEM 2

Explain the general directions and the numbers of the railroads in the several sections of the Appalachian Region. Where do most of the railroads cross the mountains? What river valleys do they follow? What large cities are at the eastern and western ends of these roads? Where do the railroads reach their highest altitudes?

What products are carried by the railroads of New York, Pennsylvania and Maryland? Why is the railroad from West Virginia to Norfolk, Va., an important freight route? Why are there only a few railroads crossing the Southern Appalachian Mountains? Why has the Cumberland Plateau fewer railroads and cities than the Alleghany Plateau?

Why are the railroads connecting Pittsburg with Lake Erie important to the industrial towns of Western Pennsylvania? What products are carried to the Lake Ports and carried to Pennsylvania from the Lake Ports?

Are all the products of this section carried to markets on railroads? What other means of transportation are available? Why were the river routes important in the early development of the country? What river routes were most used for trade and exploration? Why is the city of Chattanooga better served by the railroads than by the Tennessee River?

Why are there railroads into mountain areas that furnish very few products for trade? What cities of the Great Valley

are the best situated for trade? Why are the railroads following the lowland from Albany to Buffalo more favorably located than any other roads that connect the eastern ports with the west? Why may the Hudson River be said to be the Gateway to the Continent? Why is the Erie Canal still much used for trade when so many railroads exist in the same section?

Summary.

What advantage would there be in a canal for ocean-going vessels from Lake Erie to the Hudson River?

What have been the large effects of the Appalachian Barrier in the history of our country?

What industries would be affected by an Appalachian Forest Reserve?

The Geographic Conditions Summarized

Location.

The location and subdivisions of the Appalachian Region.

The relations between these subdivisions.

The significance of the Appalachian Region as a barrier.

Climate.

Comparative climatic characteristics of the several portions.

Climatic variation from south to north and with altitude.

Effect on distribution of forests and resorts.

Surface.

The general characters of the several divisions.

The extent and relative heights of the Appalachian Mountains.

The location of passes and their early and present significance.

The surface and soil characteristics of the Great Valley in its several parts. The reasons for soil fertility and richness. The effect on early industry and population.

The extent, height and character of the Plateau. Its soils, forests and the relations to population, railroads and occupations.

Agriculture.

The distribution and character of agriculture in the several parts of the Great Valley. Reasons for the early occupation of the Great Valley. Pennsylvania and East Tennessee.

The relation to markets.
The occupations of the mountains and plateau.
Reasons for isolation of the peoples of the Plateau.

Lumbering and Mining.
The distribution and character of the forests. The relation to manufacturing in the Great Valley.
The mineral products. Their distribution and value. The relation of minerals to other occupations. Significance of the anthracite coal area. The bituminous district.
Reasons for the development of coal in the Appalachian Plateau and the lack of development in the Cumberland Plateau.
The relation of mining areas to routes of transportation and to seaports.

Manufacturing.
The distribution and character of manufacturing. The chief cities and their products. Relation to other sections of the country for raw materials. Proximity to markets and effect upon character of manufactures.
The geographic location of the larger cities and the reasons for their development.

Summary.
The location of the several states in reference to the sections of the Appalachian area.
The significance of state boundary lines.
The influence of industries on the distribution of population.
The effects of the Appalachian Mountains and the Great Valley on the Civil War.
The future of the forests.
Historical relations to the northern Great Valley.
The relation of New York, Philadelphia and Norfolk to the productive areas of the Appalachian Region.

The Prairie States

1. Why are Agriculture and Manufacturing Constantly Increasing in the Prairie States ?
2. Why are the Great Lakes a Great Route of Commerce ?

METHOD OF PROBLEM 1

What are the chief forms of agriculture in the Prairie States? Where are the leading corn, spring wheat, winter wheat and fruit areas? What features of climate, surface and soil influence the distribution of these crops?

Why can machinery be used extensively in agriculture in this section? Compare with the conditions in the eastern states. Why are dairying and beef cattle feeding prominent in sections of this group of states? Why are swine and horses raised in great numbers?

Which of the more important cereals are largely consumed on the farms? Why? What manufacturing depends directly on the products of the farms for raw products? How does the development of manufacturing and large cities affect the character of the agriculture?

What other sources of raw materials have these states? What industries are dependent on coal? iron? lumber? Why is the manufacturing of agricultural implements and wagons important in these states?

Where are steel making, slaughtering, and furniture making most developed? Why? What other special forms of manufacturing are found in these states?

What large cities are especially prominent for their manufacturing? What other facilities beside raw materials and power must a section have in order to develop manufacturing?

Where are the largest cities found? Why? Are they primarily devoted to manufacturing?

METHOD OF PROBLEM 2

Why is the trade between the Prairie States and the eastern states so extensive? What products are sent in foreign commerce? What are consumed in this country? How?

What products can be more cheaply sent by water than by land? Why are the Great Lakes more important in trade than the Mississippi? Has this always been true? Give reasons for answer.

What ports of the Great Lakes are near to sources of raw products that enter into trade? What kinds of products are

sent out from Duluth, Ashland, Chicago, Milwaukee, Detroit and Cleveland? What are the imports of these cities?

What forms of manufacturing near the lower lake ports depend on imports from the upper Great Lakes? Why are Duluth and Chicago the leading upper lake ports? Why is Buffalo well located for manufacturing and commerce?

Why have not the Canadian cities on the Great Lakes grown as fast as the cities of the United States? What disadvantages have the Great Lakes as a commercial route? What would be the advantage of a canal from Chicago to Toledo?

Why are the products passing through the "Soo" Canal greater in quantity than those of any other canal?

Summary.

As the United States increases in population what will be the effect on the foreign exports of the Prairie States?

Why are steel mills being opened on the upper Great Lakes?

Why are the forests of this region of less significance than formerly?

Why did the cities on the Great Lakes at first grow more slowly than those along the Ohio River?

THE GEOGRAPHIC CONDITIONS SUMMARIZED

The extent of the Prairies. Relation to the Great Plains. Reasons for differences of occupation in the large.

Climate.

The average temperature and rainfall conditions. The seasonal distribution of rainfall and temperature. The length of the growing season. Comparison with the Atlantic Coast States.

The relation of climate to the general distribution of natural vegetation.

Surface.

The extent of plains in the Prairies. The influence of glaciation on surface and soils. The character of the rivers and valleys.

Interruptions to the plain character of the surface. Missouri and Arkansas.

The effect of surface on the distribution of crops, on transportation lines, on the distribution of cities.

The effects of climate and surface on the general distribution of the more important cereals.

Agriculture.

The physical and economic conditions favoring the development of agriculture.

The relative importance of the cereal crops. Special crops and their distribution. Relation of fruit areas to the Great Lakes.

The industries dependent on agriculture. Grazing, character and extent. Reasons for the importance of animal products.

Mineral resources.

The distribution and relative importance of coal, oil, gas and other rock products. Effects on distribution and character of manufacturing.

Special consideration of the iron and copper districts and the reasons for their importance. Relation to transportation routes and to the industrial cities of the eastern states.

Manufacturing.

The character and distribution of manufacturing. The larger manufacturing cities. Their location and the significance of location.

The relative importance of the section in manufacturing.

Commerce.

The surplus products and the natural markets therefor.

The direction and character of the trade.

Relation of commerce to railroads, to the Great Lakes and to the rivers of the Mississippi Valley.

Summary.

The reasons for the rapid development of the section in agriculture.

The relation to the center of population, of manufacturing and of agriculture.

The relative advantages of location of the several great cities.

The reasons for the recent development of the more northern states.

The relative significance of the Mississippi River and the Great Lakes in the present and in the early history.

The early development of canals and the reasons for them. The present significance of the canals.

The relation of the Prairie States to the Canadian Provinces north of the Lakes and the reasons for their comparative significance today.

The effect of the iron deposits on the commerce and the distribution of industries in the section.

The Great Plains

1. Why is agriculture rapidly increasing in importance on the Great Plains ?

2. How have the Rocky Mountains influenced the development of the Plains States ?

METHOD OF PROBLEM 1

What conditions favor grazing in this section ? What are unfavorable for agriculture ? How does distance from large centers of population affect the character of the crops ?

On what special conditions does the distribution of agriculture in the Plains States largely depend ? Where is irrigation most possible ? What crops can be grown by means of irrigation ? Why does the Government aid in the development of irrigation ?

What are the principles of dry farming ? What crops can best be grown by dry farming ? How does the area that can be irrigated compare with the area that can be devoted to dry farming ? What type of agriculture will probably prevail over the larger portion of the Great Plains ?

What portions of the Great Plains are most favorable for the continuation of grazing ? How does the character of the grazing in these states compare with that in the Prairie States ?

Why are there but few large cities in the Great Plains States ? Where are the chief cities located ? Why do so many small towns in the eastern Great Plains contain flour mills ? What are the favorable and unfavorable conditions from the standpoint of transportation ?

METHOD OF PROBLEM 2

In what ways do the Rocky Mountains affect the climate of the Great Plains ? How are the deficiencies of rainfall in the Great

Plains counteracted ? What is the source of the water secured for irrigation ? How are the artesian water resources of the Plains related to the mountains ?

What led people first to cross the Great Plains ? What was their goal ? For what portions of the Rocky Mountains did they take their course ? How have the passes of the Rocky Mountains influenced the present courses of the railroads of the Great Plains ?

What resources within the Rocky Mountains led to their development ? What was the influence of this development on the growth of the cities of the Plains ? What Plains cities have most profited from their position in reference to the valleys of the Rocky Mountains ? In what ways ?

What advantages for trade and business has a city near to the foot of the Mountains as compared with one farther east in the Plains ? Explain the paths of three of the larger railroads across the Plains ? Why are there no important north-south lines in the Plains area ?

Summary.

Why were the Great Plains a barrier to western development in the early days ?

How has the increase of agriculture in the Great Plains affected the supply of beef in the country as a whole ?

Why is beef raising not profitable in sections where grain can be grown by dry farming ?

THE GEOGRAPHIC CONDITIONS SUMMARIZED

The extent and boundaries of the Great Plains. The significance of climate and altitude on the character of the region and the distribution of vegetation.

Climate.

The general features of annual and seasonal climatic conditions.

The reasons for sub-aridity. The changing boundary of the sub-arid and the humid areas.

The causes of sub-aridity. The influence of the barrier of the Cordilleras.

The effects of climate on exploration and settlement. The early significance of grazing.

Surface.
- The general character of the surface. The relation of rivers to surface.
- The relation of surface to distribution of industries.
- The relation of drainage to surface and to the Rocky Mountains.
- The relation of surface to artesian water conditions and to the possibilities of irrigation.
- Special areas of the Great Plains. Black Hills, Texas.

Industries.
- Distribution of grazing and agriculture.
- Methods of farming and crops produced. Irrigation and dry farming.
- Relation of industries to transportation and to markets.
- Distribution of the more significant cities. Reasons therefor.

Summary.
- Areas of the Great Plains that have the least favorable conditions.
- The changing character of the industries.
- Relation of the Great Plains cities to the Rocky Mountain area.
- The future industries of the Great Plains.
- Their relative importance industrially.

The Rocky Mountains

How is the Present Distribution of Population and Industries in the Rocky Mountain States to be Explained ?

METHOD OF PROBLEM

What first attracted people to make settlements in the Rocky Mountain States ? Where were these settlements made ? Why ? Have these early towns retained their relative importance ? What minerals are now most valuable in this section ? Why ? Why is copper so important in modern times ?

Why has Colorado such an intricate network of railroads and New Mexico so few ? What advantages for agriculture have certain of the inter-montane valleys ? What disadvantages ? Where is grazing most important ? Why ?

In what ways is the National Government assisting in the development of the Rocky Mountain area ? Why ? Of what advantage are Forest Reservations ?

What sections of the Rocky Mountains are the most interesting for their scenic attractions ? Why ? How do these areas affect the seasonal distribution of people ?

Why were the valleys of New Mexico more favorable than those of Wyoming to the development of primitive people ? What determined the route of the first railroad across the Rocky Mountains ? What advantages of location have the railroads crossing New Mexico, Colorado, Montana ?

Summary.

What relation exists between the present railroads and the early trails ?

Why were the Rocky Mountains less of a barrier to western exploration and settlement than were the Great Plains ?

What minerals of this region are likely to be of the greatest significance in the future ?

What is the effect of irrigation on the distribution of industries and of population ?

Why are the water power rights of great value in the western mountains ?

THE GEOGRAPHIC CONDITIONS SUMMARIZED

The relation of the Rocky Mountains to the rest of the Cordilleran region.

Larger results of position of the Rocky Mountains.

The subdivisions of the Rocky Mountains.

Surface.

The general distribution of ranges, valleys and passes.

The effect on distribution of forests, industries and routes of transportation.

Special scenic areas of the Rocky Mountains and reasons for their significance.

The significance of the Rocky Mountain Front.

Climate.

The character of the seasonal climate as a result of position, altitude and direction.

The interior valleys from the same viewpoint.

The distribution of the rainfall.
Relation of rainfall to drainage, to use of rivers for irrigation and power.

Resources.
The distribution of forests, minerals, grazing lands as related to surface and climate.
The effects of the distribution of resources on occupation and transportation lines.

Industries.
The significant industrial areas. Their products, relation of mining centers to Great Plains cities.
The surplus products and the needs of the area. Relation to transportation problems and to other sections of the country.

Summary.
The historical significance of the Rocky Mountain Area.
The relation of passes to routes of travel and trade.
The development of water resources.
The value and significance of Forest Reservations.
The relation of the Rocky Mountains to the Great Basin cities.
The effect of the Rocky Mountains on the climate of the Great Plains and on the character of the region.

The Interior Provinces:

The Colorado and Columbia Plateaus and the Basin Range Area

Why Does this Area of Average Sparse Population Contain Several Regions of Large Industrial Significance ?

METHOD OF PROBLEM

What industries are found in this area ? How are they distributed ? Why ? Where are the conditions most favorable for agriculture ? For grazing ? What forms of agriculture are found in this section ? What is the reason for the difference between the agriculture of the northern and the southern portions ?

What other industries are found in this area ? What advantages has Utah for agriculture and manufacturing ? Why is Nevada less thickly populated than Utah ? What advantages of position has Spokane ?

Why is the Colorado River a hindrance to the development of the country ? Why is the Colorado River so well known ? Why have the forests about it not given rise to large lumbering industries ?

What difficulties do railroads meet in crossing this section ? How do they solve them ? Why do so many railroads center on Salt Lake City and Ogden ?

What conditions favor the growth of fruits and vegetables in this section ? Why are these raised when large markets are so distant ?

Summary.

How has the Great American Desert been conquered ?

What limits the possibilities of the development of agriculture through irrigation in this section ?

What has been the effect of the building of railroads on the development of the area ?

Under what conditions do industries follow the railroads, and railroads follow the industries ?

THE GEOGRAPHICAL CONDITIONS SUMMARIZED

The situation of the several sections. The reason for their distribution into separate provinces.

The larger results of their location.

Climate.

The effect of position on climate. Variation north and south.

The reason for general aridity.

Seasonal and diurnal temperature conditions.

The effects of altitude on rainfall and temperature as indicated by the natural vegetation.

The results of aridity as seen in the general character of occupations and in natural resources.

Surface.

The character of the surface of each subdivision. Relation of the surface to drainage. The Great Basin as related to the Basin Range area.

The soils and surface features of the Columbia Plateau.
The effect on occupation and character of industries.
The character of the surface features of the Basin Range area. The mountains, plains and interior drainage. The relation of soils to surface.
The Colorado Plateaus, their extent, height, character, and drainage. Reasons for the character of the Colorado Valley.
Effects of the surface features on transportation and trade.
Industries.
The character of agriculture and its distribution. Irrigation. Centers of irrigation. Variation in products. Dry farming.
Grazing and its character. Mineral wealth. Effects on the distribution of population. Relation to railroads.
The larger cities in reference to local industries, agriculture and mining. Other significant factors influencing their development.
Summary.
The distribution of irrigation projects and the relation to agriculture.
Dry farming and its relation to grazing.
Special crop areas as fruit, sugar beets, sub-tropical products.
The larger scenic features.
The development of manufacturing as related to crops and other products.

The Pacific Ranges and Valley

1. What determines the distribution of Industries and Population in this section ?
2. What are the Commercial Relations of this Group of States ?

Method of problem 1

What resources first attracted people to this section in large numbers ? Where did they settle ? How did they reach the country ? What difficulties did they encounter ?
Why did agriculture develop rapidly ? In what sections was it first the most successful ? Why ? How do the crops vary

with the latitude ? Why ? Why is the citrus fruit industry prominent in southern California ? What conditions favor the dry fruit industry in California ? The apple industry in Washington and Oregon ?

Why has lumbering developed rapidly in recent years in Washington and Oregon ? Where is grazing most successful ? Why ? Where is the growing of vegetables important ?

What industries depend largely on agriculture and lumbering ? Where are they found ? Why ? Why has manufacturing not as yet been developed to the extent that it has been in the Eastern states ?

Of what industrial value are the rivers and the sounds ? How do they compare in importance with the estuaries of the Atlantic Coast ?

Where are the larger cities ? What has determined their location ?

METHOD OF PROBLEM 2

Where are the best markets for the products of the Pacific states ? What products of this group of states enter most into domestic commerce ? Into foreign commerce ? Why are the products for the eastern states carried by land ? How do the products for domestic trade in the northern states differ from those in the southern states ?

What necessaries of life must as yet be largely imported ? What products are imported for reshipment by rail ? Where from ? With what possessions of the United States do the Pacific states have important trade ?

What ports are best situated for the Alaskan trade ? For trade with the eastern coast of Asia, the Philippines, Hawaii ?

Summary.

What will be the effect of the opening of the Panama Canal on the trade of the Pacific Coast ?

Will it increase the trade between the Pacific and the Atlantic Coasts ?

What products needed in the Pacific states will be more accessible when the interior of Alaska is developed ?

THE GEOGRAPHICAL CONDITIONS SUMMARIZED

Location in reference to climate, ocean and vegetation regions.
Larger results following from location.
Climate.
- The climatic subdivisions of the region and the reasons therefor.
- Variations in rainfall and temperature with latitude and altitude.
- Range of temperature. Diurnal variations.
- The larger crop areas in reference to climate.
- Comparison of climatic conditions with those of rest of country.
- Influence of winter conditions on industry and distribution of population. Comparison with conditions on the Atlantic Coast.
- Seasonal conditions of Southern California and about Puget Sound.
- Relation of winter climate to harbors and river use.

Surface.
- The distribution and relations of the larger surface features.
- The distribution of forests as related to climate and surface.
- The significance of the California and Washington-Oregon valleys.
- The ranges of Northern California and their significance.
- The relation of the shore line to surface.
- The distribution of harbors, as related to surface and drainage.
- The significance of the rivers. Their relations to the mountains. Scenic features of rivers and mountains.

Industries.
- The character of the agriculture in the several regions.
- Relation of crops to surface, soil and climate. The significance of climate in the dried fruit and wheat regions. The areas of vegetables. The citrus and apple areas as related to climate.
- The grazing regions and their distribution as related to climate and surface.
- The mining industries including oil, gold, silver and other metals.
- The early significance of mining. Relation to later industries.

The development of manufacturing. Where found. Why? Larger centers and the reasons for their location.

The fisheries and lumber industries as related to surface and drainage.

Commerce.

The markets for this section. How reached. Relative value of land and water commerce. Distribution of products according to the form of transportation.

The foreign commerce of the Pacific Coast. What has caused its development. Commerce with Hawaii and Alaska.

The significance of the position of the larger ports.

The necessary imports of the section. Relation of imports to manufacturing.

The future outlook for commerce of this coast.

Summary.

What will be the probable influence of the Panama Canal?

Why have Oriental races settled in this section? What occupations do they follow?

What conditions have favored the development of Southern California?

Compare the trade relations of Washington and Oregon and of California with the eastern states.

SUMMARY OF THE UNITED STATES

What is the relative rank of the United States in commerce, in manufactures, and in industrial development?

With what countries do we have the largest trade? Why?

What natural advantages has the United States as a producing and as a commercial nation?

What are the largest ports of the country? Where are they located? How do they compare in exports? In imports? Why?

What are the larger crop regions of the United States? What does each contribute to foreign commerce? To domestic commerce?

Why is our domestic commerce constantly increasing?

How has immigration affected the development of our country? In what regions do we find large numbers of Scandinavians, Germans, British? Why?

Will manufacturing increase in regions now devoted to other occupations? Why? Where may manufacturing be expected to increase with the greatest rapidity? Why?

Compare the industrial condition of our country, of Germany and of England, and explain any significant differences.

ECONOMIC GEOGRAPHY OF THE UNITED STATES

Outline of a course given in the Horace Mann High School with details as to the method of approach of certain selected problems.

Conditions of Economic Development

Character of people.
Density of population.
  Capital and labor.
  Immigration.
Service of Government.
  Protection of life and property.
    Lighthouses.
    Life saving stations.
    Weather bulletins.
    Sailing charts, etc.
  Necessity for taxation.
Expedients to facilitate trade.
  Common standards of weights and measures.
  Medium of exchange.
  International Date Line.
  Time belts.
Surface.
  Lowlands.
    Plains, valleys.
      Atlantic, Coastal, Mississippi, etc.
      Relation to agriculture, manufacturing, commerce.
      The chief railroads of the country.
        Routes followed. Advantages of low grades. Comparison of the leading railroads.
        Leading gate cities of the interior.
  Highlands. Appalachians, Cordilleran.
    Relation to occupation, especially lumbering and mining.
    Barriers to transportation.
    Importance of passes and gaps.

Coast line.
  Types, North Atlantic, Texas, California.
  Life relations.
    Location of towns, occupations, especially fishing and commerce.
    Influence on the development of a region.
Ocean.
  A highway of travel.
  Factors influencing routes.
    Winds, tides, currents, icebergs, fogs, etc.
    Ship canals, their importance in determining routes.
      Panama Canal.
Climate.
  Temperature and rainfall.
    Influence upon economic development.
      Regions incapable of development.
      Regions capable of development in summer only.
      Well developed regions.
      Products contributed by regions of extreme cold, extreme heat, by deserts, by regions of excessive rainfall.
Natural resources.
  Minerals.
    Coal.
      Formation.
      Classification and distribution.
      Available supply.
      Consumption and waste.
      Conservation, needs and methods.
    Petroleum.
    Natural Gas.
    Iron.
    Copper, etc.
  Water.
    See detailed outline for method of organization.
  Forests.
    Original forest area of United States.
    Extent and value. Compare with other nations.
    Present area of forests.

Consumption.
Waste in consumption by logging, milling, fire, pests, etc.
Conservation, methods and needs.
Soil.
Origin, mechanical and chemical processes.
Composition.
Classes.
Rate of formation.
Destruction.
Soil erosion; factors controlling.
Loss of mineral matter; causes.
Conservation.
Value of a fertile soil.
Methods of preventing deterioration.
Reclamation; how accomplished.

THE UNITED STATES IN THE MARKETS OF THE WORLD

Staple products.
Cotton.
Area producing.
Physical conditions favorable.
Markets.
Rank among countries.
Sugar.
Corn.
Wheat.
Wool and live stock.
Forest products.
Mineral products.
Manufactured products.

SELECTED PROBLEMS TREATED IN DETAIL

I. NATURAL RESOURCES

Water.
Source of water.
Distribution of rainfall in United States.
Western Coast.
Western Interior.
Eastern United States. } Causes of varying amounts.

Underground water.
  Use underground.
  Emergence in various forms.
Surface water. Chief uses.
  Navigation.
    Great Lakes.
      Importance among inland water ways.
      Chief trunk lines.
      Commodities carried.
      Tonnage of the Sault Ste. Marie.
    Rivers.
      Distribution of navigable rivers of United States.
      Relation to manufacturing, commerce, etc.
        The Atlantic Fall line.
      Importance in determining the location of cities.
      Mississippi System.
        Number of miles of navigable waters.
        Past and present commercial importance.
          Reasons for decline.
    Comparison of river and Great Lakes transportation.
    Comparison of railway and water transportation.
    Needed improvement of rivers.
      Recommendations of Inland Waterways Commission.
Water power.
  Cities determined in their location by the presence of water power.
    Related industries carried on in each.
  Past and present importance of water power in New England.
  Uses of water power today.
  Future importance.
    Its aid in the problem of the conservation of coal, particularly emphasized.
  Amount of water power available in United States.
City water supply.
  Various uses to which water is put by a city.
  Sources.
    Rain water stored in tanks.
    Springs and wells. Artesian water.

Lakes and streams.
Supply for home city studied.
Importance of purity. How contaminated.
Irrigation.
Arid region of United States.
Location.
Population compared with humid section.
Importance of irrrigation.
Government projects.
States in which projects have been developed.
Detailed study of some leading projects.
Salt River Project.
Roosevelt Dam.
Location.
Height.
Reservoir.
Size.
Distribution of water.
Results of project.
Area and land that may be reclaimed through irrigation.
Conservation of water.
Reasons for value of irrigated lands.

II. COTTON

By means of charts and maps locate the leading cotton plantings in the United States. Verify your chart and maps by the text.

Conditions of cultivation regarding surface, rich moisture-holding soil, drainage. Use of fertilizer.

Climatic conditions necessary—even but not excessive temperature—rainfall necessary—long growing season—sunshine—very sensitive to *frost*—no strong winds during maturing season.

Sum up these conditions.

Locate regions of great cotton areas elsewhere. Compare surface conditions (soils especially) of India, Egypt, Japan, China and Brazil with those of our cotton regions. Compare *climate* conditions. What is your conclusion regarding comparative production? Test your conclusion by use of world production of cotton chart.

Discuss the planting and cultivation of cotton in our southern states—amount of hand labor required in Colonial time for picking—effect of invention of cotton picker upon amount of labor necessary. (If climate of our North Central states had been satisfactory for raising cotton what would have been the effect upon *slavery?*) Discuss old way of removing fibre from seeds—effect upon labor and increased production of Eli Whitney's invention of the cotton gin. Location of gin houses. Compare sea-island cotton fibre with fibre of Japanese cotton, with upland cotton fibre—difference in use and value of each. Effect of this difference upon commerce.

Discuss baling of cotton for transportation. Transportation:
When possible by boat. Why?
Points of concentration of the crop. Why?
Ports from which cotton is shipped.
Sections of United States that import cotton from the South.
Discuss the chart in Robinson, p. 144, as to this.

By-products—study charts.

Reasons why New England manufactures so much cotton cloth. Leading manufacturing states and cities there. Difference in labor in factories. Moisture for process needed.

Reasons why the southern states are exporting relatively less cotton. Great cotton mill cities in the South and reasons for this industry there. Compare the labor used on the plantations with labor used in factories. What has been done about child labor in the cotton mills? Safety and health protection?

Leading manufacturing states and cities in the South. Difference in quality of cloth made in North and South. Why?

Transportation of cloth:
1. To stores, where sold to consumers for home use.
2. To factories, where "ready-made" garments are manufactured and sold.

Raw cotton sold to *other* countries—Robinson 402. Large ports receiving our cotton. Great advantages of cotton manufacturing in England. Of what value is the Manchester ship canal to this industry?

Other countries extensively engaged in manufacture of cotton cloth.

Problems:

Locate other regions where cotton may be raised to commercial advantage. Why are Great Britain, France, Germany interested and intent upon finding these places and raising cotton? What effects have development of water power, skilled labor, local markets upon shifting and increasing cotton manufacturing to the South?

Material—maps, graphs, pictures, exhibit of cotton—by-products—manufactured products.

Handle other fibre plants in a like manner only less extensively.

III. PANAMA CANAL

Search for routes to India.
- Portuguese—via Africa.
- Columbus—westward.
  - His various voyages and their results.
- Balboa.
  - Journey from Atlantic to Pacific.

Roads across Isthmus.
- Balboa's Road
- Panama Road
- Tehauntepec Road

} Briefly described.

- Railroad
  - Immediate causes for its construction.
  - Builders.
  - Cost of project in labor, lives and money.

Canals.
- Projected by Spaniards.
  - Approximate date.
  - Route.
- Projected by Scotch.
  - Date.
  - Route.
- Projected by English.
  - Date.
  - Route.
- Projected and commenced by French.
  - Date.
  - Route.

De Lessep and the Suez Canal.
De Lessep and the Panama Canal.
Undertaking described.
Causes of failure.
Projected by People of United States.
Date.
Route.
Canal zone—how control was secured.
Work.
Establishment of sanitary conditions.
Construction of canal.
Length, depth, width.
Sea level and lock types compared.
Chief difficulties in construction.
Gatun Dam.
Culebra Cut.
Cost.
Influence upon trade.
Important routes that will be changed.
Time saved through shortening of routes.
Relative trade advantages of leading commercial nations as a result of the opening of the canal.
Trade advantages of the leading ports of United States.
Toll rate.
On merchant vessels.
Coastwise vessels.

Laboratory Work

1. Fill in an outline map of the canal locating the chief features necessary to an understanding of the problem, i.e., the Atlantic and Pacific oceans, Panama, Colon, Chagres River, Culebra Cut, Gatun Lake, Gatun Dam, the locks, the canal route, the Panama Railroad.

2. Construct a profile of the canal from Colon to Panama, using the following dimensions and the following scales:

Sea level entrance channel through Limon Bay to Gatun, 7 miles in length. At Gatun a lift of 85 feet by means of three locks, each giving a lift of approximately 28 feet, to Gatun Lake.

A 32-mile stretch at this level through Gatun Lake and Culebra Cut to Pedro Miguel Lock. At Pedro Miguel Lock a drop of 31 feet to Miraflores Lake, which is 2 miles in length and 54 feet above the sea. From Miraflores Lake a drop of 54 feet to sea level by means of two locks, lowering the level 23 and 31 feet respectively. An eight-mile stretch at sea level to the Pacific.

Horizontal Scale, $\frac{1}{4}$ in. = 1 mile.

Vertical Scale $\frac{1}{2}$ in. = 28 feet.

3. On an outline map sketch the chief routes from the leading ports of China, Japan, India and Australasia to New York.

On a second map show which of these routes will, in your opinion, change after the opening of the canal.

Compare with an authoritative map.

Indicate distance covered by each route.

4. On an outline map show the present routes from New York to the western South American ports.

On the same map show what change will result from the opening of the canal.

Show, as above, the saving in distance. From a study of tables of distances, compare the relative advantages of New York and Liverpool in trade with India, China, Japan and Australasia, after the opening of the canal. Also the present and future advantages of New York and Liverpool with reference to the western South American trade.

In the same way study the influence of the opening of the canal on the trade of New York and New Orleans.

FIG. 1.—Open-Air Class—Second and Third Grades—Horace Mann School

The open side of the room (at the left of the picture) faces south

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OPEN-AIR SCHOOLS

I

INTRODUCTION

In the education of to-day the problem of fundamental importance is the physical welfare and efficiency of the child. The child who is in poor health is, as a rule, found to be backward in school studies, not because of defective intelligence but because of underfeeding, organic weakness, or incipient disease.

Along with the present tendency to discover and correct physical defects has arisen the movement for more outdoor life for the young child. How can the physically debilitated child get more outdoor life and still meet the requirements of compulsory education laws? Instruction in the open air is the answer to the problem.

For this outdoor school work those children are selected who are physically unfit to remain in the ordinary indoor school room or to benefit by its instruction.

It has been known for some time that delicate and tuberculous children and adults become stronger and in many cases get well out-of-doors while they become weaker and die indoors. The one fact open-air schools have established is that sickly children are made healthier and stronger in this new environment.

It would be cheaper in the end, as well as more humane, for every city to provide free open-air classes with food, warm clothing, medical aid, and a teacher for every group of twenty children, thereby producing strong healthy bodies able to com-

bat disease, and active minds finding interest and pleasure in useful occupations, than to go on with the present partially successful school system and in the end spend more money year by year on courts, judges, jails, free food, municipal lodging houses, hospitals, asylums, charity organizations, and the rest of the modern means of trying to deal with mental, moral, and physical incompetents.

About three per cent of the entire school population need outdoor treatment. The Fourth International Congress of School Hygiene, held at Buffalo, New York, August 25-30, 1913, is responsible for the statement that "Nearly a million tuberculous children or children strongly disposed to tuberculosis are attending our public schools and there is hardly accommodation for 1,500 to receive instruction in the open air." It thus becomes a question not of whether a city can afford to establish open-air schools but rather one of whether it can afford not to establish them. Without open-air classes money must be paid by the school community for educating children who through early death must be counted as a complete loss to it in the end. It has been and always will be true that the competent persons of a community must carry every ounce of the burden of those who are incompetent. The growing percentage of incompetents in our large cities is appalling.

At present we cannot say that open-air school life will cure tuberculosis as this disease is often apparently cured in childhood to crop out again from the ages of twenty to thirty years. The following-up of the life histories of these cases can be the only means of proving the full value of the outdoor "cure."

The whole open-air school movement got its chief impetus through the efforts of various societies interested in the prevention of tuberculosis which started and financed this work until results were assured and the public became interested. Wherever school instruction was needed in connection with these open-air classes the local school board usually furnished the teacher and paid her salary. In many cities these societies now feel that the school board should assume full charge and expense of the open-air school so they can turn their attention to other much needed social services.

The idea of the out-of-door movement is not modern. Centuries ago the need for more outdoor life for young children and the value of outdoor education were advocated and urged by the great educators of that time. The ideas of time-honored as well as present-day writers upon this subject are suggested by the following quotations:

"Come with me, my son. Let us go into the open. There, through Nature, you shall see that which God has been doing since the beginning and that which He is continuing to do."

Comenius

"Why in place of dead books, should we not open the living book of Nature? To teach youth is not to inculcate a mass of words, phrases, sentences, and opinions gathered from authors; it is, to open for him, by means of things, understanding and judgment."

Comenius

"The city becomes the charnel-house of the human species; at the end of a few generations the human race perishes or degenerates. It becomes necessary to renew it and it is always the country that furnishes the new life. Send your children then where they may live in the midst of fields, in order, so to speak, that the life within them may be regenerated, in order that they may find again the vigor that was lost in the unhealthy air of a thickly populated place."

J. J. Rousseau

"It is especially during the first years of life that air and sun benefit the constitutions of children; they penetrate the soft and delicate skin by all the pores, they affect especially young bodies, leaving upon them traces which are ineffaceable."

J. J. Rousseau

"Up to twelve years the child should be out-of-doors in order to cultivate his senses."

J. J. Rousseau

"Learn from the school of life and experience. Traverse the fields and other grassy places, visit the trees and the plants, compare them with the books of ancient authors who have written concerning them, and take home with you whole handfuls of them. When the weather is unfavorable, instead of herborizing visit the apothecary, the chemist and the druggist, and carefully consider the fruits, the roots, the leaves, the seeds, and the gums."

Rabelais

"Of all the flowers, the human flower is the one which has the greatest need of sunshine."

Michelet

"The artisans of ancient Greece always saw whichever object of art they were working upon out-of-doors; it was to fit into, to be surrounded by the universe, so to speak. Grecian art, philosophy, morals, and government were modelled in the open, and there they had their being and found their expression. Every phase of fortune of the state and of the family took place out-of-doors,—whether marriages or funerals, victories or defeats, triumphs or losses."

D'Annunzio

II

HISTORICAL SKETCH

In Charlottenburg, a suburb of Berlin, there opened in 1904 a new type of school to which the Germans gave the name of "Open-Air Recovery School." The object of this school was to give children who were physically debilitated an opportunity to be taught and to recover their health at the same time. These children could not keep up with the work of the regular school and yet they were not so mentally deficient that they were fit subjects for instruction of the kind given to subnormal children. The treatment consisted of an outdoor life, plenty of good food, strict cleanliness, warm and suitable clothing, and school work modified in kind and reduced in quantity to suit the new conditions.

The first session of the Charlottenburg school was one of three months during which time the children had increased rapidly in weight and strength and many had been entirely cured of their ailments. Though these children had spent less than half as much time on their school subjects as the pupils in the regular school they had not fallen behind them in their progress; in some cases they even surpassed them. This of course was a more astonishing fact than the physical gain. These gratifying reports aroused throughout Germany and in neighboring countries much enthusiasm and as a result many other open-air schools were established.

In 1907 London opened its first open-air school where again the results were as remarkable as in Germany. Immediately other open-air schools were begun in various parts of England.

In 1908 the first open-air school in the United States was started in Providence, Rhode Island. A little later in the same year, a "School of Outdoor Life" was established in one of the parks of Boston. In January of the same year New York

began an open-air school on an abandoned ferry boat. Chicago and other cities soon followed with outdoor schools.

The following table shows how this movement has grown in the United States:

School year	Number of cities having open-air schools
1907-1908	3
1908-1909	7
1909-1910	15
1910-1911	32
1911-1912	44

A few details of several typical schools will be of interest.

The Charlottenburg School

For several years careful medical inspection in Germany revealed the fact that among the many children who were backward in their studies some were in a debilitated state owing to anaemia, others from various ailments in incipient stages. Educators and school physicians then devised this new plan of an open-air recovery school. The school was modeled upon the idea of employing such methods and having such surroundings as would improve the mind and cure the body at the same time.

A suitable place for the school was found in a large pine forest on the outskirts of the town. The sum of $8,000 was voted for erecting suitable wooden buildings. Five main buildings were erected, three of them being plain sheds 81 feet long and 18 feet wide. One of these three was completely open on the south side and closed on the other sides and could accommodate 200 children. The other two sheds contained five classrooms and a teachers' room; these buildings being closed in on all sides, provided with heating arrangements, and only used for instruction in very cold or stormy, windy weather. In the classrooms were simple tables and chairs of different sizes and heights. The last two of the five buildings were large sheds, open on all sides, fitted with tables and benches where the children could work and eat during rainy and bright sunny days.

Before admitting to the school the children chosen for the experiment the teeth of each child were examined and put in order, as otherwise they would not have derived the proper benefit from their food.

The children arrived at school a little before eight in the morning and upon reaching school each child received a bowl of soup and a slice of bread and butter. The classes began at eight with an interval of five minutes after every half hour of teaching. The instruction was reduced to the most necessary subjects and was never given for more than two consecutive hours. At ten o'clock each child received one or two glasses of milk and a slice of bread and butter. After this the children could play, do manual work, or read. Meanwhile this same process in the reverse order was carried on with other children who had played, read, or done manual work during the first two hours.

Dinner was served at half past twelve and consisted of meat, vegetables, and soup. After dinner the children rested for two hours; absolute quiet being required. At three o'clock there was served a lunch of bread, milk and jam. The rest of the day was devoted to informal instruction and play such as:

1. Excursions in geography, history, and nature study.
2. Practical problems in arithmetic related to gardens, houses, and so forth.
3. Gardening and digging.
4. Drawing, measuring, building.
5. Fashioning of tools and apparatus.
6. Making of pottery, weaving.
7. Making simple garments, hemming towels and sheets used in the school.
8. Washing dishes and towels.
9. Assisting in cooking and serving of meals.
10. Care of human and animal life.

At a quarter of six the last meal was given consisting of soup, bread and butter. After this the children returned home.

The children were carefully watched by the school physician, attention being principally directed to the condition of the heart, blood, and lungs, color of the skin, and eyes, and muscular and flesh development. At the end of every two weeks the children were carefully weighed and measured and their condition compared with that noted upon entrance to the school.

At the outset ninety-five children were chosen. The school

soon increased to one hundred twenty students, then to two hundred fifty.

The school year at Charlottenburg begins in April and lasts until Christmas, the months of January, February, and March being given as vacation. Because the school week and school day are longer than in the ordinary schools the teachers are paid a bonus.

The educational results were considered remarkable. All of the teachers agreed in noticing the mental alertness of the children during the hours of teaching. No less important were the improvements noted in the moral tone of the children. Their behavior in regard to cleanliness, order, self-help, punctuality, and good temper was due quite as much to the fact that during all of their waking hours they were kept from the influences of the street.

England and Germany are considering the advisability of having a constant interchange of indoor and outdoor teachers so the open-air methods may be made known and become popular in ordinary schools.

Other schools founded in Germany, England, and in Switzerland followed in most particulars the features of the school at Charlottenburg. As time has gone on such modifications have been made in the Charlottenburg plan as would better suit the environment of the school, the climate of the country, and the physical conditions of the children.

The German open-air schools are called Waldschulen from their location on forested land. Each German city that started such a school located it in the midst of woods and fields outside the city. The results of such a practice are bound to be better than in America where the majority of the open-air schools are located in the midst of the noisy city, on roofs of buildings, in courts, or down on the ground surrounded by unsodded playground areas which turn every wind that blows into a cloud of dust. England and Switzerland have followed Germany's lead in locating the schools in open woodland with adjacent sunny fields for playground space. These countries have considered the important and subtle influence of forest and field upon the aesthetic and emotional nature of children.

Open-Air Schools in Italy

The pleasant climate of Italy has made possible the development of a different type of open-air school. It is essentially an outdoor excursion school rather than an outdoor school with a fixed home as the Waldschule in Charlottenburg. It is the indoor school brought outdoors by modifying instruction so that it can be carried on by many excursions to points of educational value and interest in the vicinity.

The development of this type of school work in Italy was favored by the poor housing of the schools with its attendant evils of poor ventilation and light. Many of the schools are located in ancient buildings not fitted for school purposes. This outdoor school movement grew out of the summer colony schools of Italy with their well-known satisfactory results and the remarkable success of the Charlottenburg experiment gave to it added encouragement. According to an Italian report summer colony schools were started in Florence, Italy, in 1853, Zürich, Switzerland, in 1876, and in Frankfort-on-Main, Germany, in 1878. This points to Italy as the first country to value an outdoor school life, for part of the year at least. The most famous of the outdoor vacation schools started in Padua, Italy, and were known as "Ray-of-Sun Schools." The name attests to the value placed upon sunshine. The only building these schools made use of was a tent-like structure open on all sides.

The distinct feature about the open-air school today in Rome is that at any time of the day and year an indoor class can turn itself into an outdoor class. The nature of the work and the kind of lesson determines whether the class shall leave its indoor room and adjourn to the sunny roof or to the school yard, or go on an excursion. After one class gets through with the roof another is free to go there, thus making it possible for each class to benefit a part of each day by outdoor instruction.

In preparing lessons the teachers are cautioned to keep in mind the following points:

"Knowledge of local geography should be gained intuitively. Regular assignments in the subject should be more objective, more direct, and more natural, developing the powers of ob-

servation and reproduction. In this way, by exciting the spirit of criticism, the mind will become more active.

"Geometry too should become a practical study using all existing forms (barns, houses, towers, streets, avenues, and so forth) for observation, study and measurement.

"Lessons in history should have as a starting point some monument or some relic of the past pertinent to the subject in hand. The educational value of such instruction is extraordinary."

A folding-portable combined desk and chair has been the special feature of the Italian contribution to the successful handling of the open-air school problem. This piece of furniture is light, compact, convenient, and easily handled. It consists of a combined seat and desk, held together by a framework, which is easily folded into a compact form about 4 inches thick, 18 inches wide, and 2½ feet long. The size depends upon the age of the pupil. It is fitted with straps to attach it to the child's back in the manner of a knapsack. On excursions each pupil carries his own portable desk and chair without any fatigue whatever. Drills are given to train the children to detach, unfold, set up, fold, and attach these desks in the shortest space of time. When not in use they are stacked in the corridors of the school building.

Because of these folding-portable desks and chairs any indoor school can turn its classes into the open and there continue to give any sort of a lesson which calls for the use of desk and chair. Fitted with this portable school furniture the pupils in the high school, as well as those of the lower schools, can make good use of roofs, playgrounds, parks, and excursions.

The problem of making a school or class excursion really beneficial to each member of the group has been solved by the invention of this folding-portable desk and chair. Formerly the children have not gotten as much from seeing things first hand as they should; in fact, much of the excursion work seemed of doubtful value. The details in handling an excursion which are helped by the folding-portable desk and chair are:

1. How to keep the children from becoming fatigued.
2. How to maintain discipline.

FIG. 2.—Open-Air Class—Roof Playground—Horace Mann School

FIG. 3.—Open-Air Class—Outdoor Play at 8° Above Zero—Horace Mann School

3. How to manage so all of the children give full attention to the point in hand.
4. How to manage to teach the whole group at the same time.
5. How to enable the pupils to take notes and write down observations and impressions.
6. How to maintain on an excursion the spirit of work and earnestness shown by the class when in the classroom.

The Horace Mann School

The Horace Mann School of Teachers College, Columbia University, New York City, represents another type of outdoor school, namely, that developed in the midst of a busy, noisy city and situated on the roof of the school building. This is a very successful school and is representative of what can be done in surroundings not so ideal and quiet as those of the forest schools of Germany. The Horace Mann School is also in the forefront in experimenting to see what can be done to make the outdoor problem a success and to overcome its disadvantages. The open-air classes in the Horace Mann School are located on the roof. The children who make up the classes were chosen because they were nervous, or irritable, or anaemic, or undernourished. There are at present two open-air classrooms, one having 8 second-grade and 16 third-grade pupils, the other being made up of 15 fourth-grade children. There is also an open-window room of fifth- and sixth-grade pupils. The open-air rooms are of concrete and steel structure, the walls being concrete. Each room is closed on three sides only, the south side being entirely open with a drop curtain to close that side in time of storm. There is a slanting roof which is higher on the south side. (See Figs. 1 and 4.) There are windows in the upper half of the north side of each room which may be opened or kept shut according to the weather; there are also a few such windows in the east and west walls, besides skylights in the ceilings. The pleasant and cheerful appearance of these rooms is due quite as much to the admission of light through these large skylights as to that from the sides of the room. Figure 1 shows the room occupied by the second- and third-grade pupils, the third-grade pupils working at their

desks under the direction of their regular teacher while the second-grade children are at the right in the picture about to have a lesson from the assistant. Figure 4 shows the fourth-grade room. The floors are of wood. Indoor toilet rooms are provided and also an indoor room where children may go to get warm if necessary in exceptional cases. There are movable desks and chairs which make it possible easily to clear the floor space for games and exercise. There is also an open space on the roof for play and recreation. (See Figs. 2 and 3.) Details in reference to the organization of the Horace Mann open-air rooms will be given in later chapters.

III

ORGANIZATION OF TYPICAL OPEN-AIR SCHOOLS INCLUDING OBSERVATIONS BASED ON PERSONAL VISITS

The phrase "open-air school" applies to all school rooms situated in the open air, and fully exposed to the air on one or more sides, providing merely shelter from wind and rain. There is no artificial heating, the temperature of the room always being that of the open air. An "open window" room is one which is usually heated artificially in winter and supplies fresh air and cold temperatures through open windows, there being no entire side of the room fully exposed to the air from floor to ceiling.

It is not the purpose of this chapter to collect facts which are fully treated in the books mentioned in the bibliography but to add to the material already given in these books some observations based upon personal visits to a number of open-air schools. In connection with this chapter it will be well to read some of the standard books already published on this subject such as "Open-air Schools" by Ayres where the organization of the older open-air schools is fully explained. "Open-air Crusaders" by Kingsley will also be of service.

Rooms

In the Ethical Culture School of New York City the open-air classes are located on the southern half of the roof of the regular school building. This roof space is enclosed by walls on the north, east, and west, and roofed over. By means of doors and windows the east side can be made open. The south side is open. Two-thirds of the entire space is divided into four classrooms, the partitions between the classrooms being made by means of canvas drops, movable blackboards and screens; the rest of the space makes up passage ways and a play area. The

arrangement is such that the whole area can be cleared and used as play space or, when desired, made into one large classroom. The special feature of the Ethical Culture open-air school is a flexible grading plan. The method of handling the subjects of study, the grading of the pupils and the arrangement of the roof space all lend themselves to the carrying out of this idea.

The arrangement of rooms in the Horace Mann School has already been described on pages 11-12.

The open-air school of Montclair, New Jersey, is in a one-room army tent. The south side is left open, the other sides can be open or closed as desired. Being situated on the ground just north of an old school building the sun does not reach the tent for any length of time, making it seem cold and damp. The kitchen, bathroom, and eating and sleeping quarters are situated on the second floor of the old school building. More was done for the children in this tent and better care was taken of them than for any other open-air class of poor children I saw.

The Carmine Street School of New York City is located on the roof of the public baths. The room is large, very light, bright, and cheerful. It has the most attractive situation of any open-air room in New York City. There are windows on each side, small ones to the east, while on the south, west, and north the whole sides are taken up by great windows reaching from the ceiling to the floor. Each window is divided into three sashes, which makes it possible to throw up the lower two. The amount of window space that is open depends upon the state of the wind and weather. There are heating coils on the west side. There is a small play space on the open roof, with toilet rooms, and kitchen close at hand. The desks face the west; through the windows before them the children can see an attractive stretch of sky broken by the tops of trees growing in the adjacent park.

There could hardly have been chosen a more unfortunate location for two open-air class rooms than is found in Public School 33 of New York City. The school building itself is one of the oldest ten in New York City. Since there were reasons why the roof could not be used, the Commissioner of Parks and

Public Playgrounds permitted the school to hold two classes, from 9 in the morning to 3 in the afternoon, under the covered space belonging to the playground to the south of the school building itself. Canvas partitions enclose each room on three sides, making the rooms very drafty and cold, which is the result in every case where these substitutes for walls are used. The playground is a constant source of choking dust, as well as noise. On days when parochial schools have holidays and the public schools are in session the noise from the playground makes teaching impossible. At three o'clock the teachers and pupils must leave as their permit for the use of the space ends at that hour. Steamer chairs, books, and clothing are moved into the school building. As the desks are too heavy for the children to carry, and as the janitor says his contract does not read for the carrying back and forth of the furniture of these classes, they are left behind.

The tuberculous children treated by Bellevue Hospital which overlooks the East River are housed on a ferry boat, called the "Southfield" which is moored to the pier adjoining the hospital grounds. A great deal has been said by various writers concerning the wonderful fact that for open-air schools almost any sort of a discarded building could be utilized, even an old disused ferry boat. There is much that is picturesque, it is true, about the Southfield. It is different, many windowed, circular walled, and informal. In winter, however, it is very cold and windy, and in stormy weather its decks cannot be used; neither is it conveniently arranged. As an informal structure it serves its purpose very well. Its great advantage is its location on the waterfront with freedom from dust and noise, two elements which are so difficult to eliminate in an open-air school in a large city.

The Fourth International Congress of School Hygiene, held at Buffalo in August, 1913, in a set of resolutions presented to the United States Government has petitioned the government "To place at the disposal of the various States of the Union as many of the discarded battleships and cruisers as possible, to be anchored according to their size in rivers or at the sea-

shore, and to be utilized by the respective communities for open-air schools, sanitorium schools, and hospital-sanitoria."

In the Phebe Anna Thorne Open-Air Model School for Girls at Bryn Mawr, Pennsylvania, an open-air class of fifteen *normal* pupils is located in a detached one-story building, facing south, constructed of wood and glass after a Japanese model. The four sides are open whenever the weather permits, though on stormy days, one or all of the sides can be closed by means of glass screens. The class room opens upon a large uncovered platform eight feet by thirty-six feet which is used for gymnastics, etc. The dressing rooms, dining room, and kitchen are in an adjacent cottage. Each day the siesta is taken on the broad piazza of this cottage. The school is conducted by the Department of Education of Bryn Mawr College. Each year a new class will be started until there are seven classes in all, each class to have its separate building of the kind described above.

Many other open-air classes were visited. A general criticism of the outdoor rooms seen must be that about half of them are gloomy, dirty, and non-aesthetic. Open-air rooms are not favorably located unless the sun can shine into them for the major part of the day. The sun is a great sterilizing agent and the children have gone out-of-doors to get more sunshine, and more cold fresh air.

On the whole, tents are sunless, gloomy, and bare, and they will probably continue to be so, for in order to make them water tight a heavy outer covering of canvas must be stretched to extend well over the tent on all sides thus shutting out direct light rays. There is great need for solving the light problem in the open-air rooms. An extra high opening on the south will aid in doing this, also an arrangement of studio windows will help. In the regular indoor rooms the walls and ceiling are generally so colored as to reflect light to the best advantage. In the gloomiest of the open-air rooms seen the walls were either dark gray or brown.

In a city the open-air rooms should be located as far away from street noises as possible. Flapping canvas partitions should

be replaced with firm solid walls which would not only stop a noise nuisance but stop drafts as well.

For a city roof school the best room type I have seen is that of the Horace Mann School; for the country a building patterned after the Phebe Anna Thorne School at Bryn Mawr, Pennsylvania.

Floors

There is need for keeping the feet warm. Most open-air classes have either tile or cement floors which are very cold. There is need for wooden floors, especially where the equipment is meager and in weather not severe enough for sitting-out bags to be used. In a number of schools comfort and physical welfare are sacrificed for the major part of the day in order that the floor space may be used for occasional games and play. The tendency to use movable desks and chairs, light enough in weight for the child to handle so that the floor may easily be cleared, is a reason why individual wooden platforms are not more generally provided. Individual wooden platforms, with sides boarded in, would protect the feet from drafts and assist in solving the sitting-out bag problem in those schools having tile or cement floors.

Equipment

Desks. In most cases the desks used were the same as those for the indoor classes. In the public schools of New York City they are the oldest and worst of the discarded indoor kind of a previous period. Where space is limited they are usually movable so the room can be converted into resting or play room as required. In smaller towns where there is plenty of playground the open-air rooms have the same kind of fastened-down desk and chair found in indoor rooms. In the Ethical Culture School the desk is replaced by a swinging arm attached to the chair which can be pulled toward the pupil or pushed aside at will. In a small drawer fitted below the chair seat a few of the most needed books and papers can be kept. In all classes visited, where the desks were pushed aside to provide play space and replaced at the end of the period, the work was done quickly and efficiently. In some schools the teacher paid no attention to the question of the position of desks and chairs with regard to the

direction of light rays. Some classes had their backs to the light, others faced it. One teacher wanted to have the room look informal and in order to carry out this feeling she permitted the children to sit as they pleased. Some sat in the sun, facing west; others sat in the sun, facing north; and still others sat in the shade, staring into the bright southern sky.

Chairs. Chairs should have solid backs to protect the children's backs. Most of the chairs seen had open slat backs. Severe, deep-seated colds may be due to unprotected backs. In the Phebe Anna Thorne School at Bryn Mawr the seats and backs of the chairs have twice the usual width. This gives the children greater freedom of movement and protection.

Steamer chairs. In all classes visited a period of rest followed the noonday meal. In one school of normal children it took the form of silent reading. In most schools, where the children tried to sleep, the angle of the steamer chair was purely a personal matter with each child. A few preferred a nearly horizontal position, the majority tried to sleep and rest sitting up. Those children who were sitting up were very restless, felt cold about the shoulders, and on severe days constantly evinced a desire to cover up the head by creeping into the sitting-out bags. One school physician realized that real rest comes best when in a horizontal position and in his school the steamer chair was folded and laid on the floor, a blanket placed upon it, making a protected and comfortable bed. Wrapping himself in another blanket the child found no difficulty in falling asleep. In this class only one child was too nervous to rest quietly; he was given a space away from the others where he might move about undisturbed. Horizontal canvas cots are also sometimes used. (For further details see Ayres.)

Clothing

Boys' suits are heavier and warmer than girls' dresses and for this reason boys are better clothed to resist cold winds and low temperature than girls. Fifty per cent of the girls in open-air and open-window classes wear cotton and linen dresses all the year round. Depending upon the severity of the weather, the usual extra wrap worn by these girls is a sweater. Girls from poor homes wear woolen dresses and regular winter overcoats.

Of the girls who wear cotton dresses and those who wear woolen ones, the former get chilled more quickly, appear colder, and have more colds than the latter. It is worthy of note that the ones wearing cotton dresses have warmer undercloth-ing than many of those wearing woolen dresses. It would seem that the wearing of cotton and linen dresses in cold weather should be prohibited in these schools.

The sweaters furnished by the home are not nearly as warm as those especially designed for outdoor classes. These sweaters are grey in color, very rough and hairy on the outside making them thicker than the ordinary kind. At the same time they are light in weight and pliable. A whole suit consisting of toboggan cap, gloves, sweater, and jumper can be gotten all in the one color. (See Fig. 2.) The manufacturers are now making a model of a new sweater long enough to come well below the knee, thus doing away with the use of the jumper where sitting-out bags are used.

The Parka. In the matter of garments especially suited to a cold and variable climate the Horace Mann School feels that it has found a solution in the "Parka." This is an outside gar-ment fashioned after the lines and principles of the outside upper garment of an Eskimo. (See Figs. 1 and 3.) It is made of very closely woven khaki. "For a garment that has no warmth in itself it is the warmest garment I have ever seen," is the general comment of those who have used it. The special advantages of the Parka are due to its being very light, to its not hindering the free and usual movements of the body because of its pliability, and to its keeping all of the body heat from escaping. If too much energy is expended in keeping the sur-face of the body warm most of the benefits of being out of doors are lost. Under the Parka can be worn one or two or no sweaters, enabling the wearer easily to accommodate the amount of his clothing to the mildness or severity of the weather. The Ethical Culture School has followed the Horace Mann School and adopted the Parka. The Parka is manufactured and sold by the Rogers Peet Company of New York City.

Some schools feel that the clothing that the home provides to bring the child to school is sufficient for wear in the open-air

rooms with the frequent exercising given there. Breakfasting in a warm room, and then running or walking to school mean that by the time the children arrive at their open-air room they are very warm, resulting in the desire to take off their outside wraps, even on very cold days, rather than to put on anything extra such as a sitting-out bag. Mittens and caps are taken off and sweaters and coats unbuttoned. By ten o'clock the reaction has set in and the teacher has to remember to give directions for getting on more clothing, using mittens and sitting-out bags. If in cold weather this was done at the end of fifteen minutes it would prove more beneficial than at the end of an hour. As a rule the average child would not take it upon himself to put on more clothing, if not urged to do so. In some schools instruction is given in the necessity of keeping the body at an even temperature and of co-operating with the teacher on this important point.

In one school visited the teachers went to another extreme. They had been told of the evil effects of sitting still with the body in a state of perspiration, so when the half hour play periods come orders are given to take off all outside wraps and leave them on the chairs. On a windy day, with the thermometer at 40 degrees Fahrenheit, twelve girls, ranging in ages from nine to thirteen years, stood still rubbing their cold hands and trying to shrink into themselves so there would be less of them to feel cold. Finally one of them got a ball and threw it to each of the others in turn while they stood in a row. When it comes to open-air treatment of this kind it is reduced to "the survival of the fittest" scheme of a former age.

Gloves. For the same sum of money woolen gloves or woolen mittens can be bought. The fingers are much freer in the gloves. There is some difference of opinion as to which is the warmer, some contending that the fingers are just as warm separated as they are when together as in a mitten. Children seem to dislike wearing mittens more than wearing gloves. It appears to be easier to handle materials, write and pick up things when the glove is worn than when the hand is covered with a mitten.

Footwear. The kinds of foot covering worn over the shoes are felt overshoes, felt lumberman's boots, lambskin overshoes, and arctics. The lambskin overshoes have the fur inside, making a shoe much too warm for any but very cold weather. In many places they are being discarded as they have a tendency to make the feet tender and over-sensitive to cold. The felt lumberman's boots are very satisfactory, protecting the leg to the knee, and having for use in wet weather an overshoe of rubber. In some classes each child had been furnished with arctics at $1.35 per pair which were not giving the warmth or the wear of felt overshoes at half the cost.

Sitting-out bags. The kind used in most of the schools visited was made of a brown, pliable, hairy, felt-like cloth bound with tape and fitted with snap fasteners. It is slit to the knee in front in order to facilitate getting in and out of it. The foot end of the bag has an outside covering of khaki reaching half way to the knees. When adjusted the bag is pulled well up under the arms and fastened close around the waist and up the front. The small of the back needs the protection which the bags can give, yet in any class where the teacher is not vigilant one half of the bags will be on the floor even on the coldest days.

The cost of the sitting-out bag described above depends upon the size of the child. The smallest bag costs $5.50, the largest $7.50. Home made bags cost much less. Dr. Thomas S. Carrington in an article in the *Survey,* April 23, 1910, tells how to make an inexpensive sitting-out bag.

Some teachers consider the sitting-out bag cumbersome and it is certain that most of these bags are very dusty. One father wrote the school principal that he wished his child to be transferred to an indoor class because the dust from her sitting-out bag filled her lungs and kept her awake at night. That night the open-air teacher sent the bags home to be beaten by the parents. After this experience the father withdrew his application for removal.

Food

The value of nourishing and frequent meals in improving the condition of underfed and undernourished bodies has been re-

peatedly demonstrated by records and charts. Up to within a year it was thought impossible even to consider carrying on the open-air work without feeding, but experiments and comparisons carried on in New York City for the past year tend to show that though the greatest gain in weight is gotten where the children are fed, a steady, small gain was made where no school feeding was carried on. As the winter of 1912-1913 was not a severe one, and as an experiment covering one year only cannot be conclusive, more data should be collected on this point before the fact can be established. The winter of 1913-1914 was an unusually severe one and the records for that winter should prove interesting.

In winter extra demands are made on the body by the frequent exercising necessary in keeping up the bodily temperature. This is a strain for underfed bodies. The majority of open-air classes are for anemic children and those disposed to be tubercular who come from homes where the food is not the best fitted for body upbuilding. Home conditions among the poor have proven one of the drawbacks in carrying on the work. The school nurses and the teachers of these children have learned the necessity of finding out the home conditions, resulting in visits which have revealed that the usual meal is bread and coffee. Among the foreign born the coffee has either whiskey or brandy put into it. This abnormal diet is quickly detected as it results in a high temperature and an excessively high pulse. Teachers and the school physicians realize the importance to tubercular and anemic children of a wholesome diet. In the schools where the food problem has been satisfactorily solved it has been due to the willingness of a local charity organization to defray the expenses. In many cases after the society has borne the expenses for two or three years it refuses to continue its support. At this point, in some cities, the question of feeding during school hours has been dropped; in others, as in New York City, the home has been asked to furnish a lunch or to pay ten cents a week which will provide a daily lunch of crackers and milk (two crackers and a very small cup of milk). It has been left to the discretion of the teacher whether the milk be heated or not in cold weather. It does not seem very prob-

able that the school will provide these children with free food however badly they may need it because such procedure would bring the demands for "no favoritism" down upon the school board.

The teachers of open-air and open-window classes have found it necessary to have mothers' meetings in regard to food, clothing, and sleep. Demonstrations have been given to show how to prepare simple and nourishing meals, emphasis being placed on the lesser cost and the greater nutritive value of the meals prepared at school over those given in the home. In Italian, Irish, and Syrian communities it was found necessary to teach the mothers the food value of the various vegetables and to demonstrate the best methods of preparing them. Among these peoples the chief and constant article of diet was either spaghetti, potatoes, or white bread, according to nationality. The children from these homes were suffering from chronic constipation and at first had to be coaxed and taught to eat soup, turnips, carrots, squash, spinach, beets, and brown bread. Montclair, New Jersey, has done more toward solving the food problem than any other town. It has an excellent cook who prepares the food according to the best known rules for variety, method, quantity, and nutritive and heat values. In this school the following recipe for bread has proved its function of curing constipation. The recipe will make two loaves. It is better when it is old.

2 cups bran (ordinary bran—loose—not in packages).
2 cups white flour.
2 cups graham flour.
1 level tablespoonful salt.
1 cup raisins or nuts.
1 tablespoonful lard or good drippings.
1 teaspoonful baking soda dissolved in 1 tablespoonful hot water.
Equal portions sour milk and molasses. About 1¾ cups of each will be required.
Batter should be thick, but not too thick to drop from spoon.

Bake slowly 1½ hours. Put a basin of water underneath bread when it is baking and the crust will not be hard.

Cost

Where the child is fed and provided with a warm clothing equipment the cost of educating and caring for him in open-air

schools is nearly three times as great as in the ordinary school. The tendency at present is to experiment on no feeding and no extra clothing; in such cases the cost is reduced somewhat. In many schools the children pay a small sum each day which covers the cost of the food eaten.

The prices of various articles of clothing used in outdoor schools can be found by consulting Ayres' "Open-air Schools."

Size of Classes

In order that outdoor classes be successful it has been demonstrated that they must be small, not over twenty pupils to a teacher. The necessity of looking after the child's health as well as his studies necessitates this limitation. It is thus seen that outdoor classes are much smaller than indoor classes. In the same school system which provides a teacher for twenty anemic pupils, whose parents are willing to permit or even may have requested open-air instruction, the regular indoor teachers are struggling in a more or less poorly ventilated room with fifty children some of whom are as anemic and nervous as the twenty but whose parents are afraid of the cold air. In a class of from fifteen to twenty-five pupils each child is bound to get more individual instruction than in the larger indoor classes. The outdoor rooms of the public schools of New York City have from three to eight grades, a grade often being represented by one or two pupils. This means practically individual attention. Children who have been backward for years are brought up to grade by this means.

Program of Studies

Although outdoor pupils spend less time on school subjects than normal school children they have not fallen below them in their school records. To meet outdoor conditions, as well as the physical and nervous state of the pupils, it is necessary to have a reduced time schedule. The German plan of reducing formal instruction to two hours a day has not been carried out in most American schools.

School programs will be found in Ayres "Open-Air Schools," and in the Reports issued by superintendents of the various cities where open-air schools have been established.

Methods of Teaching

It is generally conceded that those methods of teaching which make for constant changing from work to play and from rest to recreation are best suited to open-air instruction. Whenever possible those features of a lesson are sought which can be turned into a game or which can be carried out in an activity of some sort.

As the Horace Mann open-air classes are located on the roof at some distance from the regular indoor classrooms, they have felt the necessity of making themselves known to the rest of the school. One of the most interesting plans adopted was to post now and then, on the bulletin board in the main hall of the school, an illustrated notice of the weather conditions on the roof.

Writing with gloves on has been found beneficial to the subject of penmanship. The thickness of the gloves caused the child to find it difficult to grip pencil or pen in a firm enough grasp to cramp the muscles; the results have been a free arm movement,—this was quite contrary to the general expectation. (See Fig. 4.)

In the open-air classes the motivation in English, arithmetic, history, geography, and nature-study seems more natural, more related to the social life of the child than in the indoor classes having the same subject matter; there seem to be more problems that force themselves upon the child for his solution than occur in an indoor life. This point in itself would appear the most significant one in the value of open-air over indoor instruction.

New ideas and methods of teaching will come in time from the accumulated experiences of open-air instructors who are experimenting with their material. At present many teachers are simply holding indoor classes in the open air as far as method of teaching is concerned. In Chapter VI this topic will be considered at greater length.

Recreation

The amount of time given to play and to directed exercise in different schools varies greatly, not only in time but in kind. Some schools have a five-minute supervised dance or gymnastic

period at the close of each twenty-five-minute recitation, with the usual fifteen-minute recess in the middle of the morning when something to eat is taken. Other schools have each day a ten-minute recess for free play, two ten-minute breathing exercise periods, and one forty-five minute sleeping period.

The greatest amount of daily recreation noted in any of the schools visited consisted of two thirty-minute periods for practicing and playing co-operative games, such as baseball, basketball, and football; one half-hour rest period; and one forty-minute period the first half of which was devoted to lunch, the rest to listening, in a warm room, to a story read by one of the teachers.

Social Phases

The open-air school especially lends itself to developing social co-operation and helpfulness. During the lunch period a few children each day may take their turn in waiting upon and in looking after the needs of the others. Motivation here is of a direct and imperative kind. A few serve the majority because by so doing all do not have to expose feet and legs to the colder air of the room by getting out of their sitting-out bags. During luncheon a child will tell a story. Here the motive for drill in oral English appears plainly to each child.

Health Precautions

As the experiences in open-air procedure accumulate certain special facts in hygiene are being noted. When a child becomes a little chilly and needs external heat to warm him it has been found that unless he takes off all extra outdoor clothing while in the house it results in bronchitis. The use of various kinds of foot-warmers and of soapstones has been found to be detrimental in the majority of cases. If because of poor circulation or an anemic condition the pupil needs extra stimulus to keep up his circulation it has been proven that a few special short gymnastic exercises are more beneficial than application of external heat by means of soapstones or footwarmers. The best methods of quickly warming the fingers, toes, legs, arms, and chest by physical exercise have developed some new and interesting gymnastic movements. Certain games have been

FIG. 4.—Open-Air Class—Fourth Grade—Horace Mann School
The children are facing west. The open, south side of the room is at the right

FIG. 5.—Open-Air Class—Children Tending Plant Boxes—Horace Mann School

found to be especially effective in developing lung capacity, straightening the back, and giving muscular coordination and poise.

The following are some good corrective games and exercises now in use:

(a) For lung development

1. Blow up an imaginary paper bag. In bursting the blown-up bag, arm and back muscles are brought into play.
2. Blow off all the seeds on an imaginary dandelion.
3. Smell of an imaginary rose, first closing one nostril, then the other.
4. After the floor has been washed and dried have the children lie on the floor flat on their stomachs, the class being divided into two groups facing each other. A pingpong ball is placed in the middle of the space between the two groups. The game is carried on by blowing the ball. Any one who has to touch the ball forfeits for his side. This game is splendid for the back and neck muscles as well as for developing lungs and expanding chest. This is a good exercise for spring and fall months. The others are especially fitted for winter.

(b) For muscles of the arm, leg, back, and so forth

1. Pick up imaginary snow. Round it into hard snowballs. Throw them.
2. Stand on tiptoes, reaching up as far as possible in order to lift the body and place the chin on an imaginary bar. This exercise is called "lifting your own weight." After each trial it releases the blood and sends it rushing through the body. It is an excellent exercise for warming the body and correcting the harm done by a cramped sitting position.
3. One of the best exercises known for warming the fingers is to tap sharply into the palm of one hand with the fingers of the other. In this exercise the finger tips should be held together firmly or the blood will not be forced into the ends of the fingers.

4. Put the hands on the hips. Balance on one foot. Point forward and downward with the toes of the other foot. Bend the knee pulling the leg up as high as possible without losing balance. Then kick forward vigorously. This exercise will send the blood into the toes. It is better in its results and more lasting than the use of soapstone and footwarmers.

(The last three exercises are especially designed for keeping the body warm in cold weather.)

5. The rhythm of the multiplication tables can be utilized in the arm and leg exercises of the usual gymnastic drill.
6. In the free play time the pupils love to hang from the swinging rings and walk on the balance bars and on chalk lines, unconsciously gaining poise and grace.

Those children who have had at home coffee, brandy, whiskey, and beer show the effects of these stimulants by an alarming pulse rate, fever, sleeplessness, and restlessness. As these conditions were especially found among the children who were suffering from tuberculosis it was sometime before the school physicians and nurses learned that the home and not the disease was largely to blame for these symptoms. Even after the parents have promised to mend matters, lapses occur. Plenty of wholesome food furnished at school, instruction to mothers, and co-operation on the part of the child are all essential to the success of this work.

When the children in open-window and open-air classes get colds they are very deep-seated, prolonged and stubborn ones. A record of these colds reveal

(a) That girls get more colds than boys.
(b) That girls who wear cotton or linen dresses get more colds than girls who wear woolen ones.
(c) That some of the mothers let their children go out of doors in winter after taking a hot bath.
(d) That children who by nature have hot skins cannot stand drafts or sudden cold weather without getting severe

colds. They are not, on the whole, fit pupils for out-of-door classes.

(e) That the children of the very poor sleep either in rooms which have no windows or in rooms the windows of which are kept closed, thus making these children more susceptible to colds.

(f) That the children of the very poor need baths and a thorough rubbing of the skin in order to get the skin in condition to react properly to the fresh cold air.

(g) That children who suffer from constipation get colds more readily than those who do not.

Health Results of Open-Air Treatment

In tabulating the results achieved in the various open-air schools certain of them are constant and others appear variable. Formerly, one of the first rules laid down for the guidance of those about to start such a school was that warm clothing, much sleep, frequent exercise, frequent and nourishing meals, and shelter from winds and storms were absolutely necessary to carry out the outdoor scheme. It still remains true that the more carefully these points are followed the more successful the results become, but it has been demonstrated that gain has been made even in those classes where no extra feeding, little exercise, a limited clothing equipment, and heavy drafts are found. Constant factors in open-air school life are the gain in weight, strength, chest expansion, hemoglobin, and physical activity. Another point that has shown the advantage of the outdoor over the indoor class is the matter of fatigue. It does not seem to make any difference whether arithmetic is taught at nine o'clock or at twelve, the children appearing to do equally good work at any time of day. In those cases where an afternoon nap was formerly indispensable, at the end of six months in the open-air class these children not only no longer needed naps but they gradually got to the point where they could not sleep in the afternoon. They were not fatigued enough. We are told by teachers and advocates of open-air instruction that there is no doubt that these pupils have healthier appetites, sleep much better, and are more alert and vigorous mentally than when they began in the open-air class. Since these teachers hold mothers'

meetings in which they urge open windows in the bedrooms, and a change in diet, laying stress on the injurious effects of coffee and alcoholic stimulants and begging for their discontinuance, there should be taken into consideration the fact that if the same crusade had been started when these same pupils were in indoor classes there would at that time have been an improvement in sleep and appetite.

The New York City public schools have chosen certain indoor classes of normal children for purposes of comparison with the corresponding outdoor grades. These indoor classes are called "control" classes. The conditions in these control rooms are as nearly as possible the same as in the outdoor classes with the exception of the outdoor feature. Each child who is admitted to an open-air class has a card allotted him on which a record is made of his age, sex, color, nationality, height, weight, per cent below weight for height, haemoglobin, chest measurements, physical defects (tonsils, enlarged glands, adenoids, poor posture, etc.), condition of teeth, chest, grade, and scholarship. From time to time subsequent examinations are made and the results recorded on his card, and at the end of the year a final examination is made. On the back of the card a weekly record is kept of his weight. Each child who enters a control class has a card which is exactly similar and on which his record for the year is kept. Some interesting facts have been brought out. The easiest record to make and to plot on a chart is that of gain or loss in weight. For each pupil week by week and month by month such records have been kept. In the outdoor classes these records have been a valuable asset for they have been used as the great argument in favor of open-air work. Each pupil in these classes has gained steadily, some more, some less, from the beginning of school in September until the beginning of spring. The average gain is one-half pound per child per week. When the child was at school he gained in weight, when at home for more than three days he lost. During each vacation there was a decided loss in weight which made the line on the chart give a sharp downward angle. From the middle of March on to the end of school in June the loss of weight begins and the charts generally, without exception, show a downward curve. These charts have been most carefully kept in

classes of very poor, underfed children. Just how much of the gain in weight is due to an extra meal and how much to fresh air is not known. In considering the gain in weight the normal gain for any age due to growth has been allowed for. The loss of weight during the spring months is never enough by June to put the child at the same weight that he had in September when he entered school. How much of this difference is the natural one due to a change to lighter clothing has not been determined.

Hemoglobin tests have also been made. Those records which tell the history of the child's home condition, health, habits, school progress, and personality are the most valuable ones kept so far. To get even these facts is difficult. Even in those schools where the clientele is such that it is possible to send out questionnaires only a small percentage of them are answered and returned. In some schools the information can be gotten only by the visits to the homes by the teacher, the school nurse, and the social worker. Beginning with the Twelfth Annual Report of the New York City Public Schools (1910) scientific charts and tables have been printed each year showing the results of the open-air school work. In few other school systems are the results of their open-air school work tabulated so systematically for general distribution. The New York City charts showing the relation between the control and the outdoor classes with regard to increase and decrease in hemoglobin; gain in weight of the control, outdoor feeding, and outdoor non-feeding classes; and the relation of anemia to poverty are all very interesting. Final conclusions should not be drawn until experiments have been carried on for a period of five years at least. It is only by careful experiments that real knowledge of the results of outdoor instruction can be gotten.

In the Horace Mann School tests such as the following have been reported:[1] "Two third-grade classes, as similar as it was possible to have them, were compared for a period of six months. One class was an outdoor class, the other a regular indoor class. The two classes were compared in respect both to physical improvement and mental improvement, with the following results:

[1]For further details see "Effect of Outdoor and Indoor School Life on the Physical and Mental Condition of Children" by Harold Brown Keyes, M. D. Report, Fourth International Congress on School Hygiene, Buffalo, August, 1913.

PHYSICAL IMPROVEMENT, 1912-13

	Indoor	Outdoor
Average age at beginning of tests	8 yrs. 6 mos.	8 yrs. 4 mos.
Duration of tests	6 mos.	6 mos.
Average gain in—		
Weight	1.6 kg. or 3.5 lbs.	1.7 kg. or 3.7 lbs.
Height	2.6 cm. or 1.0 in.	2.8 cm. or 1.1 in.
Girth of chest	1.3 cm. or 0.5 in.	1.8 cm. or 0.74 in.
Girth of chest expanded	1.5 cm. or 0.6 in.	1.7 cm. or 0.7 in.
Breadth of chest	0.9 cm. or 0.37 in.	0.2 cm. or 0.07 in.
Depth of chest	0.0	—0.4 cm. or —0.13 in.
Lung capacity	8.0 cu. in.	5.9 cu. in.
Strength, right arm	1.4 kg. or 3.0 lbs.	0.8 kg. or 1.7 lbs.
Strength, left arm	1.4 kg. or 3.1 lbs.	2.1 kg. or 4.5 lbs.
Strength, upper back	2.0 kg. or 4.4 lbs.	2.0 kg. or 4.4 lbs.
Strength, chest	2.8 kg. or 6.2 lbs.	3.2 kg. or 7.0 lbs.

" Indoor class improved more in four of these measurements. Outdoor class gained more in six of these measurements. Classes gained the same in strength of back. Outdoor class gained more in height, weight, and girth of chest."

" We had wondered if the eyesight of the outdoor children would suffer any from added exposure to sun and the necessity of looking at blackboards and books on which sun might shine. In no case did we find any defect coming on during the term such as would be shown with Snellen test type.

" A record of contagious diseases was kept during the year. In the three outdoor classes there were five cases of contagious diseases; in the indoor classes there were fourteen cases of contagious disease. Again in this case it is only fair to keep in mind that there were more children in the indoor classes and therefore more opportunities for contagious disease. If these cases are reduced to percentages the record of outdoor children shows that 12.5% had contagious disease while 17.9% of indoor children had contagious disease. Another very significant point is that no contagious diseases ' went through ' an outdoor room as happened in one of the indoor rooms. This seems to me to be in itself a powerful argument in favor of outdoor schools."

Mental tests indicating progress in the usual school subjects were also given. From the outline below it will be seen that " in formal English the third grade outdoor class not only had higher averages than the indoor class but improved 20% whereas

the indoor class improved only 13% during the year." In arithmetic the outdoor class improved 20% against 6% for the indoor class.

MENTAL IMPROVEMENT, 1912-13

	Number of pupils	Average		Improvement
		Dec.	May	
		Per cent	*Per cent*	*Per cent*
In formal English:				
Open air	18 in Dec.... 12 in May...	37	57	20
Indoor	22 in Dec.... 27 in May...	35	48	13
In arithmetic:				
Open air	14 in Dec.... 22 in May...	48	68	20
Indoor	28 in Dec.... 24 in May...	69	75	6

It is the ambition and practically the pledge of the teacher of open-air classes to be able to put a child at any time into the indoor class of his grade and have him go on there as well as if no change of class had been made. The majority of the pupils of an open-air class are put indoors at the end of one year, but in those cases where the child's condition has not shown enough improvement a second and even a third year is allowed in the outdoor class. The gain in the second year is greater from the start, not only in weight but in mental attitude and interests. Some very satisfactory cases have been followed up in the indoor classes which have shown the value of two or three years out-of-doors. These children were formerly way below age, staying two years in a grade, indifferent to school, and having no interest in continuing any kind of school work. After the outdoor period these same pupils ranked well toward the top of the indoor class, which fact gave them such pleasure and confidence that by earnest work they were soon beyond their normal grade.

Many schools have begun with one open-air class and have then added a new one each year until the eighth grade has been reached. The problem of getting started and equipped has often occupied the attention of the teachers to the exclusion of any

real mental testing to show what really has been accomplished from month to month and year to year. If the class could keep up with the corresponding indoor grade, have more play, and no homework the experiment was considered successful and worth the extra cost.

Teachers

The teachers of open-air classes should be keen, resourceful, sympathetic, careful of all the little things, and quick to notice the symptoms of children. More depends upon the right teacher than upon the other advantages of the school, such as feeding, extra clothing, and weather.

The services of a physician, trained nurse, and dentist are necessary for at least part of the time.

Such remarks as the following testify to what teaching in the open air has done for the teacher: "No teacher who has taught in the open air will ever want to go back to indoor work." "At night I am not tired and 'dragged out' as I used to be, yet when I go to bed I fall right away into a sound, refreshing sleep." The results for the pupils are bound to be better when the teacher has lost that nervous irritability which comes from confinement for long hours in a badly ventilated, overcrowded room. The outdoor teacher has more energy and strength to prepare lessons and material for her class. At a recent meeting of the open-air teachers of New York City public schools the supervisor said that the teachers of a city system should be looked after as well as the pupils. The appalling percentage of tubercular cases is about as true of teachers as of any other class of workers. It looks as if in the future the teachers who need outdoor treatment will be instructors chosen for the open-air classes.

IV

OPEN-WINDOW ROOMS

"Open-window room," "fresh air room," "low temperature room," and "cold air room" are all different names for the same kind of room, namely, one where the windows are kept open and where artificial heating is used only in severe weather. In some of these rooms the whole south wall is given over to window space from ceiling to floor, the windows being so hinged and fitted with cords and pulleys as to enable them to be raised flat against the ceiling. These windows have not proven to be an entire success, however, as in stormy weather they have to be wholly closed. Rooms having windows on one side only have fewer drafts than corner rooms. On the other hand corner rooms have some desirable features that the others do not have; they permit of a more even flow of air through them and all parts of the room can be kept at a more uniform temperature. If winds and storms make it necessary to close the one side, the other can be kept open. Windows that swing from side to side on a pivot, and that can be so adjusted as to let in air and at the same time throw off the wind seem to be the best solution to the draft problem reached as yet.

John H. Van Pelt, an architect of New York City who is much interested in open-air school architecture, believes that the best window for such a school is one which is divided into three sashes. Each of these sashes he would hang by pivots in the middle of both sides; in time of driving rain the middle sash of each window at least could be open at a slant, the top of the sash to swing inward and the bottom of it outward and down. He also suggests that a glass marquise hung over the windows would admit light and yet in time of storm keep out rain and snow.

Professor Frederic S. Lee in an article on "Fresh Air" in the *Popular Science Monthly* of April, 1914, makes the follow-

ing interesting statement in reference to drafts: "Keep room air in motion. . . . Air in motion promotes efficiency. Accustom yourselves to drafts, and especially to big drafts. A small blast of cold air directed against a small area of warm skin may do harm, but the larger the current the more the harm gives way to benefit. Air of constantly uniform temperature is monotonous and debilitating. An occasional and considerable cooling, a flushing of the room by a sudden large inrush of outside air is, like a cool bath, stimulating."

In large cities open-window rooms will probably be more popular than open-air rooms because of the small expense to install them and the ease with which such rooms can avoid extremes of temperature, provided the disadvantages of the open-window room can be remedied by careful experiment. It is easier for the open-window room to fail than for the open-air room because of the difficulty in regulating drafts and in keeping the same temperature in all parts of the room. In general open-window rooms must have drafts in order to regulate the temperature, but unfortunately these drafts are usually small blasts of air rather than the large currents which Professor Lee believes to be so helpful. All this can be avoided in open-air rooms where the small drafts are absent and where the large currents of air can sweep the entire room. The biggest problem of the open-window room is this question of drafts.

When one makes a change, to go from one extreme to another has its value. Indoor rooms may be considered as being at one extreme and open-air classes at the other. The disadvantages of indoor rooms are more likely to be remedied by changing to open-air rather than to open-window rooms. Open-window rooms seem more to favor the tendency to get back into the ruts of indoor classroom practice than do open-air rooms. In open-air rooms one must radically change certain methods of procedure while in open-window rooms one can exist with indoor methods.

Special Points Noted When Visiting Open-Window Classes

One morning when the outside thermometer registered 38 degrees F. two open-window rooms in a small city were visited.

The sun shone brightly and the air was cold and dry. The warmth in these rooms was noticeable at once, and, on looking at the thermometers, one read 67 degrees, the other 68 degrees; the windows were nearly closed and yet most of the children were bundled up in sweaters. The teachers had no notions as to which were the best temperatures for open-window rooms. One said that she felt sure that the windows of her room were not opened early enough in the morning. On questioning the janitor it was learned that the windows were only raised ten minutes before the teacher was expected to reach school in the morning.

In the Horace Mann School the school physician feels that the temperature in the open-window room should not go below 50 degrees F. When that temperature is reached the heat is turned on automatically. Down to that point the room temperature is that of out-of-doors,—varying from it not over two degrees at most.

One school that wanted to start an open-window room found that before it could get children for the room it had to promise the parents that the children would not have to sit in drafts. The principal solved the difficulty by having window screens measuring eighteen inches in height covered with cheesecloth. The windows were usually kept open to the height of the screens. At times the whole ventilating system of the building was thrown out of order by these open screened windows as evidenced by the necessity of covering with cheesecloth the outlet register in order to break the strong drafts that blew down it. It thus appears that satisfactory devices for avoiding drafts in open-window rooms are difficult to find.

The question of clothing for use in open-window rooms has not been satisfactorily solved. Some rooms are allowed to get as cold as the lowest outdoor temperature, others can hardly be called cold air or low temperature rooms. The lower the temperature the more clothing must be provided. Chicago found, even with the thermometer at zero, "that whatever clothing would safely bring the children to school was more than enough for protection in the open-air classrooms where games were frequent." Some teachers are trying this winter whether army

blankets folded about the legs will serve as ample covering. The children in the open-window room of the Horace Mann School have had two and three winters in the open-air room on the roof and thus have brought sitting-out bags along with them which are being used. The only complaint that their teacher has made in regard to the sitting-out bags is that they are cumbersome and she cannot get over the feeling that much time is wasted in getting in and out of them.

Some open-window classes are given a lunch at recess of hot soup or cocoa and a sandwich. The children chosen for these rooms are mostly nervous, anemic, and undernourished. The rooms visited have not been in existence long enough to show what method is good and what should not be done, or to demonstrate any special gain by the pupils. However, in comparison with the regular indoor classes there is a difference that is noticeable. The pupils of the open-window classes are quieter, have a more restful attitude, and give a quicker brain response. The indoor classes in the same school give the feeling at once of nervous tension not only in the lessons but in keeping order. The teacher of the Horace Mann open-window room says that her pupils are more sane and wholesome in their attitude than any class she has taught. Their memories are so good and their interest is so keen that they do not need the drill usually given indoor classes nor will they accept a slow rate of progress in their studies. They seem to have an insatiable mental appetite.

V

POINTS IN CONTROVERSY CONCERNING OPEN-AIR SCHOOLS

Many questions have been raised in connection with open-air and open-window rooms. Among important questions to be answered definitely, including those in controversy, are the following:

1. Are the physical benefits derived from open-air experiments lasting? Are the sick children cured permanently or are their ills merely temporarily arrested?

2. Are the mental benefits lasting? Are they progressively continuous, or are they the result of over-stimulated interests and excitement due to the novelty of the new conditions and surroundings?

3. Is a city justified in spending in open-air school experiments three times as much money per child as is necessary indoors in order to educate a few sickly children and in neglecting the majority of normal children?

4. Is it fair to compare the results of open-air schools with the regular schools when we recall that the children in the open-air schools are taught in small classes of about twenty and are well-fed, well-poised, well-rested, well-aired, and little fatigued, while the children in the regular schools must work in classes of fifty, or even seventy, to one teacher, in poorly ventilated rooms, with less satisfactory conditions in reference to food, clothing and rest? Indoor school conditions are not at all as favorable as those in the open-air schools.

5. Are we using the best and most economical methods of presenting school material in our regular school classes if it is true that in the open-air schools pupils seem to be especially benefited by changes in the ordinary methods of instruction and by short periods of instruction? Does a shorter day with intensive work as found in indoor schools accomplish as much

or more than the outdoor ten-hour day found in Germany with frequent periods of recreation interspersed between short recitation periods?

6. Does the open-window school accomplish as much as the open-air school? Could the ordinary school be easily transformed into an open-window school and get better results than now?

7. To what extent does low temperature, and the stimulation due to it, explain the success of the open-air school?

8. Is moral deficiency a condition that would be benefited by open-air school treatment?

9. Can we have open-air upper grade and high school classes, or are we limited principally to the primary grades? Can the more advanced school subjects be adapted to treatment in open-air schools?

10. Is open-air school work proportionately more beneficial in the elementary grades than in the later years?

11. Is it worth while in America to have a ten-hour day for the open-air school as in Germany?

12. Will children who have spent years in an open-air school, and who appear to be advanced enough and well enough physically to return to ordinary school conditions, be able to return to the regular school room, or will their earlier open-air training tend to unfit them from going on successfully with their work in the indoor school? Will the methods of the ordinary school room, which are so intensive, put such a child at a great disadvantage?

13. Will children who have been brought up in an open-air school tend in after life to follow out-of-door occupations? Will they be handicapped if they undertake indoor pursuits?

14. Should the period of rest and sleep provided in many open-air school programs come before or after luncheon?

15. Should we have an open-air class where children may go who have whooping cough?

Mr. Frank J. Bruner, of Chicago, in an article in the Proceedings of the National Education Association for 1911, brings up a number of interesting points which show that there are still other important questions to be answered in connection with the cause of the success of open-air schools. He states

that repeated experiments prove that weak, anemic, and tubercular children and adults are benefited by living out-of-doors but are made worse and even sicken and die by being confined in heated school rooms, bedrooms, and living rooms.

While the above fact has been demonstrated, the reason why this is so is difficult to find. It is not alone because the open-air is purer than the air indoors. This is shown by the following experiments which are here very briefly stated:

(a) Carbon dioxide. Careful experiments have proven that only under extraordinary conditions is the amount of carbon dioxide in a classroom, lecture room, or living room sufficient to affect in any detectable manner the physiological processes or the mental work of an individual.

(b) Oxygen and ozone. Pure air does not mean that the air shall be rich in oxygen and ozone. More oxygen does not necessarily mean more vitality. Even a slight percentage over the normal of oxygen or ozone is injurious to lung, throat, and nose.

(c) Anthropotoxins. By experiments on animals it has been proven that organic matters thrown off by respiration are not responsible for the devitalization of the air.

(d) Humidity. The result upon the body of varying percentages of humidity has not been worked out long enough to prove any definite theory. Concerning the physiological effects of high and low humidity on temperatures ranging from sixty to seventy-two degrees Fahrenheit we know little or nothing definitely; the only result known to be true at present is that the higher the percentage of humidity the lower the temperature should be for comfort.

In summing up the results of experiments on the effects of stale, confined air, Professor Frederic S. Lee, in an article in the *Popular Science Monthly* for April, 1914, reaches this conclusion: "That the evil effects exerted upon human beings by air that has become vitiated by human beings result not from a lack of oxygen, not from an increase of carbon dioxide, not from the presence of an organic poison, not from any chemical features of such air acting through the lungs on the tissues, not in any manner from the rebreathing of such air, but solely from the physical features of excessive heat and excessive humidity

interfering with the proper action of the skin in regulating bodily temperature. The problem of bad air has thus ceased to be chemical and pulmonary, and has become physical and cutaneous."

In view of these experiments, Mr. Bruner concludes that the success of the open-air school is not due to pure air alone. He has sought, therefore, those other factors which must be prominent in explaining the success of this type of school. He finds them to be as follows:

(a) General freedom
(b) Lack of restraint
(c) Feeding
(d) Rest and sleep.

Mr. Bruner's interesting observations suggest to us a large field for investigation. Since the pure air alone is not so important as we had thought, we are led to experiment to verify Mr. Bruner's conclusions and to see if there are still other factors that explain the success of the open-air schools. We must ask also if the indoor schools would be far more successful if we introduced there greater freedom, lack of restraint, feeding, and periods of rest and sleep. If so, then the open-air movement will have made a great contribution to our methods of carrying on indoor instruction. To test this it will be worth while to try indoors the full open-air program, with its short instruction periods interspersed with rest and recreation; likewise to try an intensive indoor program out-of-doors. This will soon show us whether the open-air or something else is the vital factor in the outdoor movement.

Mr. Bruner also found that the chief air-polluting agents in cities are:

(a) Dust
(b) Soot
(c) Gases from factories and chimneys
(d) Bacteria, as well as noxious gases, arising from waste products such as ashes, garbage, and sewage.

With urban conditions such as these the necessity of experiment is urged to see if the open-air schools situated in the country, preferably in the woods, are more successful than those in the city.

VI

MODIFICATION IN INDOOR METHODS OF INSTRUCTION TO SUIT OPEN-AIR CONDITIONS

In order that the open-air school work may be carried on most effectively, it seems desirable to suggest certain modifications in our indoor methods of instruction in order that there may be no handicap to the student of the open-air school. These modifications will be most necessary in cold weather when the problem of keeping the child warm and free from exposure is the most important one. The location of the open-air school may likewise cause a modification in certain methods. If the open-air room is situated on a noisy street certain changes in methods are necessary which need not be considered for an open-air room in a quieter location.

In general, during the winter months, all recitations and class exercises must be of much shorter duration than those given in the indoor school. This is brought about by the necessity of giving the pupil frequent periods for relaxation and for keeping up an adequate circulation of the blood.

The following suggestions are made:

1. In the cold months of the year the open-air pupil is handicapped in all written work on account of the heavy clothing and outside wraps which he must wear. Written exercises of all kinds including his computations in arithmetic may thus suffer somewhat. During the winter, it seems advisable, therefore, to replace careful writing with the pen or pencil by some form of writing that will exercise the larger muscles of the body and be less affected by the restricting clothing. A device that suggests itself as serviceable would be to have the children make much more use of a blackboard, either standing at the regular blackboards or having an individual blackboard at the disposal of each pupil. The top of the closed desk could easily

be fitted with a blackboard on its lower side which could be brought into service by merely raising the top of the desk. In a large free hand the pupil could thus do a certain amount of writing and calculating. Such a blackboard, two feet long and one and half feet wide, would be very serviceable. In using it the pupil would have the advantage of not being obliged to lean over the desk as in the case of writing with a pen or pencil.

I do not hesitate to suggest also the novelty of introducing the typewriter, the operation of which would permit the student to sit upright and have opportunity to exercise a number of muscles that would be unused in the ordinary writing with a pen. The activity required in typewriting would be especially favorable in the cold weather. Investigations have already been carried on by teachers of English which show that young children can make more progress in English and in spelling by the use of the typewriter than by the ordinary means of writing by hand. The undeveloped muscles of young children always cause handwriting to be a slow tedious process. The typewriter has the advantage of emphasizing legibility and accuracy. Mistakes stand out very prominently. As classes progress it is one of the most important ways to emphasize the value of good form in writing. In no other way does proper paragraphing and punctuation stand out so boldly. The typewriter would also serve nicely in spelling tests from dictation, and as a means of taking notes of any kind which might be given by the teacher. The combination of the typewriter with the blackboard above mentioned would no doubt do away with some of the present disadvantages of the open-air methods. The typewriter should be especially useful if the open-air scheme is extended to the higher classes, including the high school, where written work plays so prominent a part. It is here the intention, however, to recommend it for the elementary classes as well. If the above blackboard and typewriter plan is not feasible it will be well as a general principle during the winter months to modify methods of instruction, so as to avoid as far as possible the necessity of long detailed exercises involving much writing.

In the fall and in the spring, when the weather is warm, the

children could have ample exercise in the usual handwriting. It is not meant by the above suggestion to do away with handwriting, but only to make it possible to do in cold weather work that otherwise might be slighted.

2. In general, in the open-air school, methods of exercising pupils *orally* should be increased and emphasized. This can be applied in practically all subjects including arithmetic, spelling, geography, and English.

Such exercises as singing and gymnastics can be considerably increased in an open-air curriculum, and can best be given by frequent repetitions between the regular classes rather than by single assignments per day, as is the usual practice in the indoor school.

3. In a subject like English, oral exercises, including oral reading and dramatic representation, can well be increased. In geography, map drawing at the blackboard and modeling can be given more prominent parts. The geography work may be aided also by excursions to points of geographical interest in the vicinity of the school. The same excursions are also helpful in connection with the work in history. The excursion idea should be much more developed in American open-air schools than it has been up to the present. In Italy the excursion is the chief feature of the open-air school. This is much more possible in Italy, however, than in America due to the milder climate. Lessons in civics, in fine arts, in current events, and in industries are thus possible, through visits to public places, galleries, court rooms, public institutions, factories, public works, and so forth. The boys in the Italian schools are provided with the combination portable chair and desk which may easily be carried on the back and set up in any convenient place out-of-doors. In this way the Italian teacher can establish his schoolroom temporarily in a public park or before some noted public monument. So far as American conditions are concerned, such excursions would have to be confined principally to the fall and spring months, except in the south and southwest.

4. Especially in the open-air school, the use of the stereopticon and the moving picture as a means of instruction will be valuable. Such devices will be especially serviceable for open-air schools in noisy districts.

5. A subject like nature study should be carried on only in the fall and spring months when the work can be done out-of-doors. Gardening is a subject which may well be emphasized for the open-air pupil.

6. In arranging the curriculum it is very important to make such an adjustment that the cold months of the year will be used most effectively for those subjects which can best be taught during that time. The out-of-door scheme will probably result in favoring, even for a private school, a forty-week school year. If children remain in excellent health through the out-of-door experiment there is less reason for the long vacation. A forty-week or a forty-five week school year should be no hardship if the open-air school proves to be what we have a right to expect.

The open-air curriculum especially favors the introduction of modern foreign languages by the direct method of instruction.

VII

SOME TESTS FOR DETERMINING THE EFFICIENCY OF THE METHODS OF OPEN-AIR SCHOOLS

It is very desirable to test the efficiency of the open-air school especially in comparison with the regular indoor school. It is especially valuable to know in what particulars the pupils of the open-air schools are in advance of the regular pupils. To determine these matters physical and mental tests should be given frequently to classes of the same age and grade in both indoor and outdoor schools. To be of greatest value the tests should be given to children of the same average state of health in both schools. It will not be especially helpful to test invalids in an open-air school and to compare these results with normal children in the indoor school. So far as possible it is necessary that the groups of children to be compared start at about the same place with respect to age, grade, development, and health. These tests to be of value should be applied to large numbers of pupils.

Physical Tests

1. Gain in weight. Is it more for the outdoor pupil than that normally expected in a growing child? Gain in weight may be taken as an index of one's nutrition. Comparison of indoor with outdoor pupils should be of much value in this test.

2. Lung capacity. As this is a test of vital capacity it will be especially important for pupils who have been more than a year in an outdoor school.

3. Examination of the blood to show gain in hemoglobin. Especially favorable results should be found here in the case of open-air pupils. Outdoor pupils who are fed in school should be compared carefully with those outdoor pupils who are not fed.

4. State of the organs of digestion. The frequent periods for light nourishment in many of the open-air schools make this an interesting test. Also keep a record of appetite.

5. Tests of hearing, of sight, and of the other special senses. The test of hearing will be important for all pupils in outdoor schools situated on noisy streets. The test of sight will be especially needed for outdoor pupils whose work has been done to a large extent with the sun shining on their desks and books.

6. Tests for physical fatigue. An especially interesting test in view of the numerous periods for rest afforded the open-air pupils. Tests and continued observations for nervousness, irritability, ill-temper, and so forth.

7. Tests of posture.

8. Tests of movements, including quickness or rate, accuracy or precision. Steadiness of motor control.

9. Tests of endurance.

10. Tests of muscular strength, grip, and so forth.

11. Careful observation to indicate freedom from minor complaints such as colds. Also a record of freedom from usual children's diseases such as measles, scarlet fever, headaches, indigestion, and adenoids. It is interesting to know whether or not the increased health of open-air pupils gives them through their greater resisting powers any immunity from these diseases. Records should also be kept to show the relation between the spread of contagious diseases in open-air and indoor classes.

12. Medical tests to see if outdoor children have any special tendency toward troubles caused by exposure such as colds, rheumatism, sore throats, and tonsilitis.

13. Careful observations of bodily temperature, especially in cold weather, would also be of value. Symptoms of chilliness such as shivering, cold hands, chattering of teeth, and blue lips should be carefully watched and noted. From observations in various outdoor classes I believe that these matters are often neglected or ignored by the teachers. I saw a number of children who were so cold that they could not get any profit out of their school work. Often children do not know when they are too cold.

14. Record of sleep.

All of the above tests are rather simply carried out. The book on " Mental and Physical Tests " by Whipple will be suggestive in reference to accurate methods for conducting such

tests. Pyle's "Examination of School Children" will also be helpful in this connection.

Tests Relative to Conduct

It is important to know whether or not the wholesome life in the open air has any marked influence on the conduct of pupils. This amounts to asking whether or not physical conditions in the ordinary schoolroom tend to favor misconduct. The following tests seem to be worth attention:

1. A careful record in reference to obedience to the demands of the teacher or to the demands of fellow students. A record of each student's ability to get along in school with his fellow pupils. The presence of disputes, quarrels, and so forth should be carefully noted.
2. General good spirit toward work and willingness to do things. Loyalty to teacher and school.
3. General attitude toward life and the world as exhibited in cheerfulness, optimism, or their lack.
4. Record of cases of marked misconduct, such as stealing, lying, willful destruction of property.
5. Record of improvement in morals. This will include items not mentioned in paragraph 4, such as swearing, sexual disturbances.
6. Tests of initiative, so far as this is testable.
7. Tests of alertness, wide-awakeness, and so forth.

Mental Tests Suggested by the Usual School Record

Children of approximately equal health, grade, and age in both indoor and open-air schools should have their actual progress tested as shown by the usual school marks in subjects such as arithmetic, reading, spelling, geography, history, and science. In a subject like arithmetic it will also be valuable to test the work of both indoor and outdoor pupils in some such special way as the Courtis test, or the Stone test. In English composition it would be valuable to supplement the tests given by the ordinary school grades by some careful measuring such as that possible by the scale developed by Professor Hillegas. Handwriting could likewise be measured in accordance with the method of Professor Thorndike.

In addition to the tests in the ordinary school subjects above mentioned, care should be taken to obtain adequate tests of manual work, such as sewing, cooking, manual training, or drawing. The results should be of interest as these subjects are usually not taught out-of-doors under conditions as favorable as those indoors. The tests in physical training will also be of value as they will probably favor the outdoor pupil.

MENTAL TESTS SUGGESTED BY PSYCHOLOGISTS

A. Tests of Attention and Perception
   1. Range of visual attention
   2. Cancellation
   3. Counting dots
   4. Reading complicated prose
   5. Simultaneous reading, and writing and so forth

B. Tests of Description and Report
   1. Description of an object
   2. Fidelity to report

C. Tests of Association, Learning, and Memory
   1. Uncontrolled association
      a. Part-wholes
      b. Genus-species
      c. Opposites
      d. Computation
   2. Mirror-drawing
   3. Substitution
   4. Rote memory
   5. Logical memory

D. Tests of Suggestibility
   1. Size-weight illusion
   2. Progressive lines
   3. Progressive weights
   4. Illusion of warmth

E. Tests of Invention and Imagination
   1. Ink blots
   2. Linguistic invention
   3. Word building
   4. Interpretation of fables

F. Tests of Intellectual Equipment
   1. Size of vocabulary
   2. Range of information

G. Tests for reasoning not included in above lists

H. Tests to show ability to understand the printed page.

NOTE.—For descriptions of these tests and directions for giving them consult Whipple's "Manual of Mental and Physical Measurements." For names, descriptions, and so forth, of instruments that can be used for making these measurements see "Catalogue of Scientific Instruments," C. H. Stoelting, North Green Street, Chicago.

VIII

TESTS FOR THIRD GRADE

I. Schoolwork tests
   1. Arithmetic
   2. Composition
   3. Reading

II. Physical tests
   1. Height
   2. Weight
   3. Test of strength
      a. Of grip
      b. Of back
      c. Of legs
   4. Tests of motor control
      a. Tapping
      b. Aiming
      c. Tracing
   5. Test of eyesight
      a. For improvement
      b. For strain on eyes from sunshine

III. Mental tests
   1. Tests for accuracy and quality of apperceptive mass
      a. From the reading book in use choose objects and situations and have them described and explained
   2. Tests for attention and perception
      a. Cancellation
      b. Counting dots
      c. Simultaneous adding
      d. Column adding
      e. Binet-Simon geometrical figures

3. Tests for association
    a. Associated words such as page-book
    b. Opposites
    c. Memory
4. Tests of powers of discrimination
    a. Size
    b. Length
    c. Weight
    d. Warmth
    e. Softness
    f. Fineness of fibre
5. Tests for invention
    a. Development of sentences
    b. Completion of sentences
    c. Word building
6. Tests for reasoning ability
    a. Interpretation of fables
    b. Jumbled up sentences (words to be rearranged so they will not make sense)
    c. Reprint, so each child can have a copy, a second grade story read the year before leaving out adjectives and an occasional verb and noun.

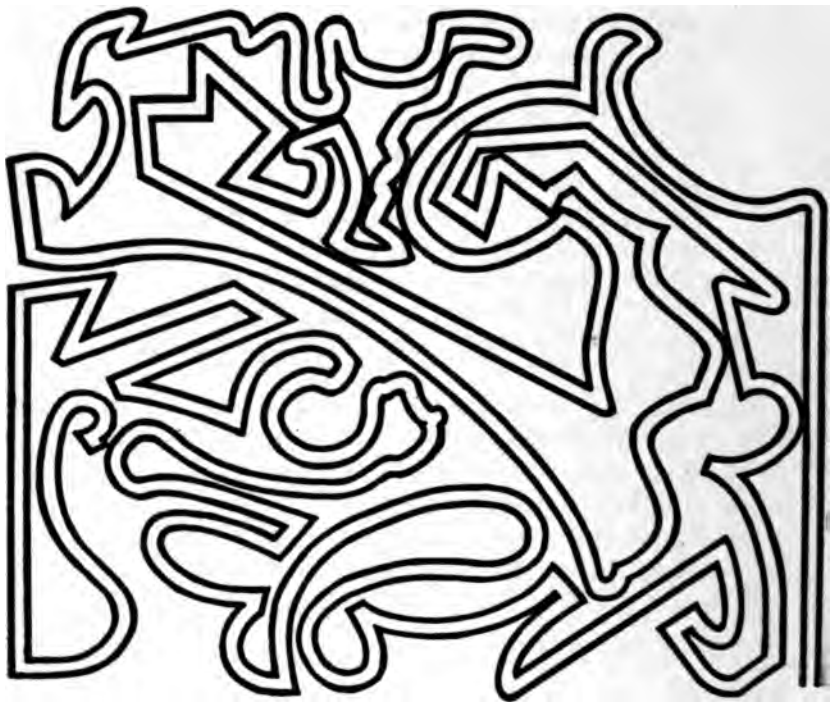
Tests like the above should be given at the beginning and end of the school year, and midway between. Indoor classes of the same grade should be given the tests at the same time in order to make comparisons.

Among some of the standard tests especially suitable for third grade pupils are the following. Others may be had from such a book as Whipple's "Manual of Mental and Physical Measurements."

Some Third Grade Tests Presented in Detail

Muscular Control Test

Maze. Draw with pencil a line between the walls of this maze. Do not let the pencil touch either of the black printed lines. Try to keep in the middle and draw as far as you can until *stop* is said. Time 1 minute and 30 seconds.



Cancellation

Striking out "A" tests

1. Draw a line through each A. Do not skip one. Time 1 minute.

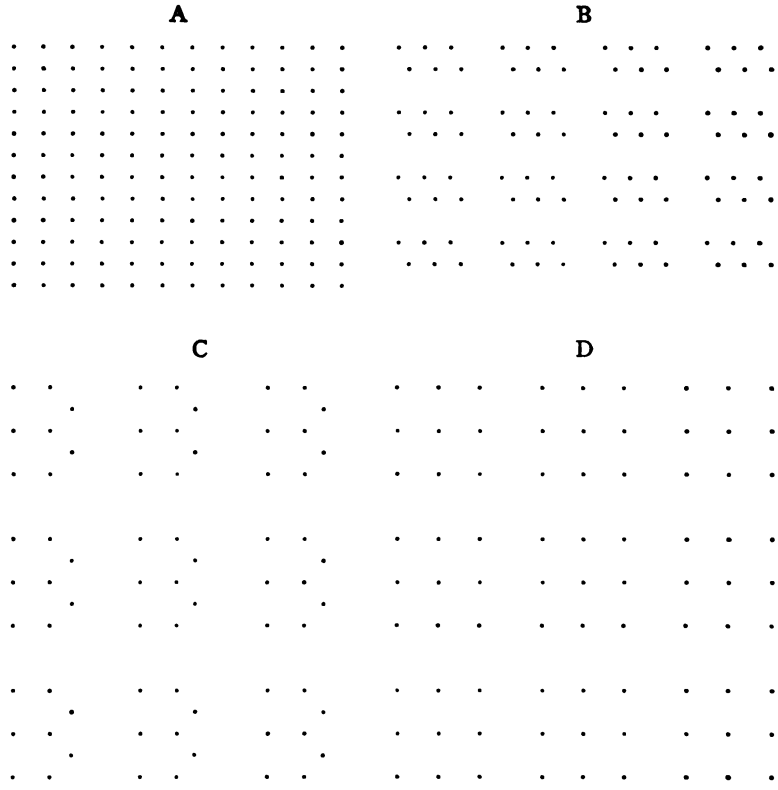
GWBTBVKIKSCSAUEBCIWVABZSMDUBKLWHKHYCGYGK
NANNCBVBSAKOIUPEKCXVGSTVRIWYBYGKHAZLPBYO
XAPYEXXHUFSBVDYDIAZLRSATZAZVFCOFSAIPTDOK
BBISKAKHXDYIUZRHVRZYSCIGECPOFKBICBMGFSDC
YHSRMVBLYICKZBMXFVBBIKUCBZLOGLVKGFMOATUN
SHOFHXIMKUXLDZKMRYRLVUWWKYEUVECSOUWBADEX
ALUAKRMSFTGXWLVGAOWBTPODXBNSFSFSWSDRSMPO
KBRIGAXZBZACKFBBEVWCGSWBMFEMXXOKRDIWGGBL
BTPNSKBACVTCSSRKUBURUDMZEWIZFESTMZEBWAFI
BKSGYHSLSFABTLTIUDXGAKROZYKOBHEAALPMLLKC
GVCWKKPTUYUGSTSSDWNKSIEICSNBTVADKANTKKPB

2. At the end of an hour after doing No. 1, do the following in the same manner as in No. 1. Use this one to show fatigue. Time 1 minute.

GAAQYEMPAZNTIBXGAIMRUSAWZAZWXAMXBDXAJZ
ECNABAHGDVSVFTCLAYKUKCWAFRWHTQYAFAAAOH
UOLJCCAKSZAUAFERFAWAFZAWXBAAAVHAMBATAD
KVSTVNAPLILAOXYSJUOVYIVPAAPSDNLKRQAAOJLE
AKNAAPLPAAAHYOAEKLNVFARJAEHNPWIBAYAQRK
UPDSHAAQGGHTAMZAQGMTPNURQNXIJEOWYCREJD
TXWAMQEAKHAOPXZWCAIRBRZNSOQAQLMDGUSGB
FUOFAAKYFGTMBLYZIJAAVAUAAACXDTVDACJSIUFMO
SNZMWAAAWHACAXHXQAXTDPUTYGSKGRKVLGKIM
JACINEVBGAOFHARPVEJCTQZAPJLEIQWNAHRBUIAS
YRQAQEAXJUDFOIMWZSAUCGVAOABMAYDYAAZJDAL
OYKFIUDBHTAGDAACDIXAMRPAGQZTAACVAOWLYX
WABBTHJJANEEFAAMEAACBSVSKALLPHANRNPKAZF

Computation Tests

Counting dots. Draw a line through each dot counted. When time is up put down your count in figures, i.e., 46. Time 30 seconds for each group.



Simultaneous adding. The teacher reads 3, 27, 35. The pupil is to add 1 to each of the numbers and write results. Then he must think of the numbers the teacher said and subtract 2 from each one and then write the result. Then he must think of the numbers the teacher gave and add 3 to each one and write the result. Time 30 seconds for each operation.

Opposites

At the side of each word given below have the children write the word that stands for the opposite. Each child should be provided with a printed list of these words. Explain carefully what is required before passing papers and do not use the same words as are given on the lists when making explanation. One half hour after column A has been done do column B. Tell children to do all they can. If they cannot think of one to go on to the next. Time 2 minutes for each column.

A	B
low	high
up	down
good	bad
outside	inside
quick	slow
tall	short
big	little
loud	soft
white	black
light	dark
above	below
many	sad
happy	true
false	dislike
like	poor
rich	well
sick	sorry
glad	thick
thin	full
empty	peace

Associated Words

(Part-wholes)

Write opposite the list of words given the names of the bigger thing of which each word in the list is a part, as *finger-hand.* Time 1 minute.

A	
door	(house, anything having a door)
pillow	(bed, couch, and so forth)
letter	(word, envelope)
leaf	
button	
nose	
page	
glass	

Ten minutes after giving list A, give list B. Time 1 minute.

B

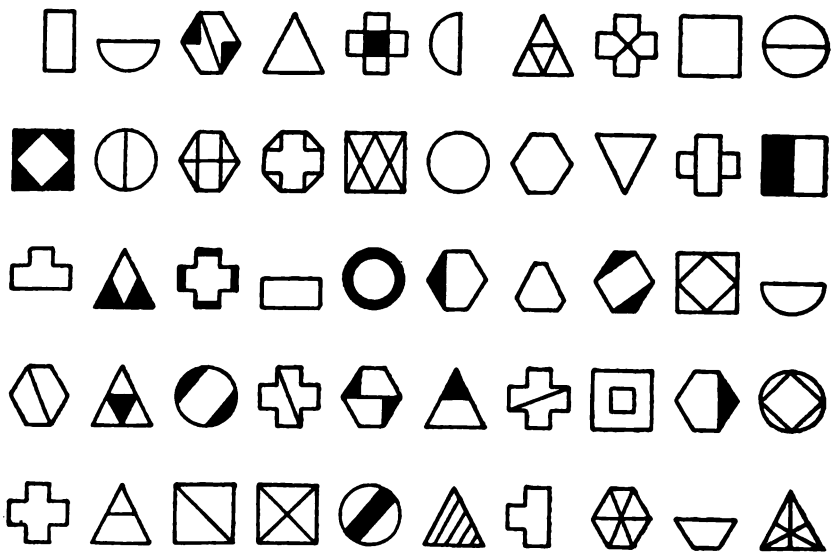
book.....(page, cover, letter, and so forth)
tree.....(leaf, branch, and so forth)
room
toy
name
boat
plant
fish

Tests of Discrimination

Montessori material can be used for this.
The Binet-Simon 1908 series of tests would also serve here.

Discrimination of Form

Give each pupil a sheet of forms like those below. Let him study these figures for one minute. Collect the sheets and have each child reproduce as many as he can remember. Let three minutes be given for this reproduction, cautioning the pupils to draw them as well as they can.



Memory

For rote memory.

1. *Words.*—The teacher reads list A once slowly. As soon as the teacher has finished the reading the pupil writes down as many of the words as he can remember. Slip A is then collected and the next list read. Time for each list, 3 minutes.

A	B	C	D	E
book	she	long	true	school
read	desk	green	break	teacher
one	black	arm	friend	book
bat	good	rich	knife	desk
doll	stone	rose	out	pen
play	ring			read
if	dress			add
sup	run			spell
bell	dish			word

2. *Sentences.*—The teacher reads each sentence separately after which the pupils write down as much as they can remember. Time allowed for each sentence, 3 minutes.

a. I have one head, I have two hands, I have ten fingers.
b. One and two are three, three and four are seven, five and six make more than ten.
c. I sit in a seat, I read from a book, I write with a pencil.
d. I get up in the morning, I go to school, after school I play, after play I go to bed.

Memory for ideas.

Read once to the class some story suitable to the third grade but unfamiliar to the pupils. Have them reproduce as much as they can remember of it. Divide the story read into as many parts as it has words standing for ideas. Count the number of ideas the children are able to reproduce and grade accordingly. By dividing into ideas, the following is what is meant:

1	2	3	4	5
An Indian	once	chased	a squirrel	into cloudland.

IX

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THE MEASUREMENT OF ABILITY IN READING

INTRODUCTION

It is the purpose of this number of the RECORD to report some of the results of work toward the construction of scales for the measurement of ability to read. The work is being continued and a much more satisfactory report will be made later; but the need for even rough means of measuring school achievement in reading is so pressing, and so many requests have come for information about these new scales, that I am giving now this preliminary account of the work, so far as it has gone.

It is obvious that educational science and educational practice alike need more objective, more accurate and more convenient measures of (1) a pupil's ability to pronounce words and sentences seen; (2) a pupil's ability to understand the meaning of words and sentences seen; (3) a pupil's ability to appreciate and enjoy what we roughly call " good literature," and (4) a pupil's ability to read orally, clearly and effectively. Any progress toward measuring how well a child can read with something of the objectivity, precision, commensurability, and convenience which characterize our measurements of how tall he is, how much he can lift with his back or squeeze with his hand, or how acute his vision is, would be of great help in grading, promoting, testing the value of methods of teaching and in every other case

where we need to know ourselves and to inform others how well an individual or a class or a school population can read.

I have at present no results to offer in the case of scales for measuring (3) and (4)—appreciation and elocution, but have coöperated with Mr. W. S. Gray in the construction of a first rough scale for measuring (1) simple, oral reading of matter-of-fact passages, and have devoted much time to scales for (2) silent reading so far as concerns (a) the understanding of words singly and (b) the understanding of sentences and paragraphs.

The scale for measuring simple oral reading or the ability to pronounce words and sentences seen will be better described after the scales for silent reading are understood. I therefore begin with the scale for measuring the ability of a pupil to know the meanings of single words seen, or, as we may suitably call it, the *Scale for Extent or Range of Visual Vocabulary.*

Scale A for Visual Vocabulary

The scale to be presented here is, I repeat, preliminary and provisional, but I shall for the present describe it and its use as if it were in final form, since reservations, criticisms, and the description of assumptions would only confuse the reader. Later, the nature, defects, and limitations of the scale will be stated frankly.

Suppose then that the members of a certain fifth-grade class are to be measured. Each of them is given a printed sheet containing the Thorndike Reading Scale A (shown on the next page) and told to " Do what it says to do," after first completing a sheet containing the Preliminary Test (shown on page 5).

Each child's paper is marked for the number of wrongly marked and omitted words in each line. The highest numbered line that the child does with one (or no) omission or error* is taken as his score or measure. Similarly the highest numbered line that the average of a class does with not over one omission or error is taken as the measure for the class.

* Except in the case of line 11, the treatment of which will be described later.

THORNDIKE READING SCALE A
VISUAL VOCABULARY

Write your name here.....

Look at each word and write the letter F under every word that means a *flower.*

Then look at each word again and write the letter A under every word that means an *animal.*

Then look at each word again and write the letter N under every word that means a *boy's name.*

Then look at each word again and write the letter G under every word that means a *game.*

Then look at each word again and write the letter B under every word that means a *book.*

Then look at each word again and write the letter T under every word like *now* or *then* that means something to do with *time.*

Then look at each word again and write the word GOOD under every word that means something *good to be* or *do.*

Then look at each word again and write the word BAD under every word that means something *bad to be* or *do.*

4. camel, samuel, kind, lily, cruel

5. cowardly, dominoes, kangaroo, pansy, tennis

6. during, generous, later, modest, rhinoceros

7. claude, courteous, isaiah, merciful, reasonable

8. chrysanthemum, considerate, lynx, prevaricate, reuben

9. ezra, ichabod, ledger, parchesi, preceding

10. crocus, dahlia, jonquil, opossum, poltroon

10.5 begonia, equitable, pretentious, renegade, reprobate

11. armadillo, iguana, philanthropic

PRELIMINARY TEST. VISUAL VOCABULARY

Look at each word and write the letter F under every word that means a *flower*.

Then look at each word again and write the letter A under every word that means an *animal*.

Then look at each word again and write the letter N under every word that means a *boy's name*.

Then look at each word again and write the letter T under every word like *now* or *then* that means something to do with *time*.

Then look at each word again and write the word GOOD under every word that means something *good to be* or *do*.

The look at each word again and write the word BAD under every word that means something *bad to be* or *do*.

cat, dick, rose, now, lion, lazy, honest, fred,

to-day, buttercup, thief, good, then, tiger, dog,

clean, daisy, before, tom, steal, yesterday,

horse, william, wolf, john.

For example, five children gave results as follows:

NUMBER OF OMISSIONS AND ERRORS IN EACH LINE IN THE CASE OF FIVE PUPILS, C, J, N, R, AND W

Line	4	5	6	7	8	9	10	10.5	11
Pupil C	0	0	0	0	1	3	3	4	3
" J	0	0	0	0	1	1	1	3	2
" N	0	0	0	1	2	4	4	3	3
" R	0	0	0	0	1	2	3	5	3
" W	0	0	0	0	0	0	1	1	0

We then say that C has ability 8; J has ability 10; N has ability 7; R has ability 8; W has ability 10½ or 11 or better. Considering these five children as a class, we would have, as the average number of wrongs plus omissions in lines 4 to 11 in order:

0 0 0 .2 1.0 2.0 2.4 3.2 (and 2.2 for the three-word line 11, or 3.7 for a five-word line of equal difficulty).

We therefore give this class 8 as a measure.

The choice of 80 per cent or four out of five correct as a standard could, of course, be replaced by 100 per cent or 60 per cent, but for reasons which scientific students will know without being told, 80 per cent is a better standard. The detailed statistical treatment of the results of the use of the scale for a single pupil, and for a class or group of classes, of the same grade in a school system, will be discussed later. For the present let us continue with what the scale shows obviously to common sense, con-

TABLE I

THE PERCENTAGES OF WRONGLY MARKED AND OMITTED WORDS IN EACH LINE OF THE VISUAL VOCABULARY SCALE A IN THE CASE OF EACH OF EIGHT CLASSES—A, B, C, D, E, F, G, AND H

	Line 4	Line 5	Line 6	Line 7	Line 8
Class A	8.3	25.5	30.3	51.7	66.2
" B	2.1	13.6	39.3	60.7	70.7
" C	3.9	12.8	28.8	41.6	57.6
" D	3.9	11.6	27.1	38.7	57.4
" E	1.2	7.9	17.6	33.3	49.1
" F	2.9	11.8	24.1	47.0	52.4
" G	3.8	9.4	11.3	35.6	48.8
" H	1.0	3.0	3.0	8.5	24.5

sidering first the records, obtained from eight classes, A, B, C, D, E, F, G, and H, which are shown in Table I.*

Table I reads: Class A on the average had 8.3 per cent of line 4 wrong or omitted, 25.5 per cent of line 5 wrong or omitted, 30.3 per cent of line 6 wrong or omitted, and so on. Class A goes over the 20 per cent of errors in line 5; Class B goes over the 20 per cent of errors (and far over it) in line 6; Class C in line 6; Class D in line 6; Class E in line 7; Class F in line 6; Class G in line 7; and Class H not till line 8. The ability of Class A is roughly 4, more exactly somewhere between 4 and 5. If we had words such that Class A could just mark 80 per cent correctly, these words would be nearer in difficulty to those of line 5 than those of line 4, so that 4.7 or 4.8 would be a fair guess. The ability of Class B is very roughly 5, more exactly between 5 and 6, and probably nearer 5 than 6, so that 5.3 would be a fair guess. The ability of Class C is a trifle higher than that of B. The ability of Class D is still higher. Class E has an average ability a little above 6. Class F is almost on a level with Class D. Class G is between 6 and 7, about halfway. Class H has an average ability a little below 8.

We have thus measures of these classes which are, first, objective, or free from the personal judgment of the one using the scale. Anybody, using the scale as directed, would get substantially the same results as anyone else. The measures are, in the second place, definite in meaning. Ability 6 means the ability to mark correctly 80 per cent of certain definite words. When we say that Class H has average ability a little under 8, and that Class A has average ability about the same distance under 5, we know what 8 and 5 mean. It is also the case, third, that the 4, 5, 6, 7, 8, etc., of the scale very probably represent degrees of difficulty that are approximately equally far apart, so that the difference between 4 and 5 is in a certain real and useful sense equal to the difference between 5 and 6, and so on. It is also the case, fourth, that in a certain real

* The records of Table I and also of Table III are not actual results with Scale A nor, on the other hand, are they artificially made up. They are real results from the use of these words of Scale A, but under somewhat different conditions than those of Scale A. So far as the points under discussion are concerned they will serve as well as actual results with Scale A itself.

and useful sense the difference between 8 and 4 very probably is somewhere nearly equal to the difference between 4 and zero ability to understand single words, so that we very probably have some right to say that the amount of this ability in the case of Class H is about twice the amount possessed by the average of Class A.

The measures that we have of these eight classes are not, however, very precise. Five words of each grade of difficulty are not enough. If the measures were precise the order of the eight classes would be the same by any line's results. The discrepancies are not great for lines 5, 6, 7, and 8, as shown in Table II; and it is possible, by using the information given by all the lines together according to proper statistical methods, to get a rather accurate measure of a class even from this one five-word scale. Even a one-word scale would give information

TABLE II

THE ORDER OF ABILITY OF EIGHT CLASSES ACCORDING TO WHICH LINE OF SCALE A IS USED AS THE MEASURE

	By line 4	By line 5	By line 6	By line 7	By line 8
Class A	1	1	2	2	2
" B	6	2	1	1	1
" C	2–3	3	3	4	3
" D	2–3	5	4	5	4
" E	7	7	6	6	6
" F	5	4	5	3	5
" G	4	6	7	6	7
" H	8	8	8	8	8

of some value, as is shown in Table III, which gives the data for each single word for the eight classes A, B, C, etc. Class H for example, is better than Class A in the case of every word of every line. Still it is clear that a ten-word or twenty-word scale will be necessary for very precise estimates of the ability of a class; and I am now engaged in constructing extensions of the scale to that end.

For measuring a single pupil a five-word scale is much less precise. A child who happened to be interested in flowers and animals would, for example, have a decided advantage over a child who was not so interested, both being measured by Scale A. Also a single child's ability with even these eight sorts of

TABLE III

RESULTS OF THORNDIKE SCALE A FOR VISUAL VOCABULARY WITH EIGHT CLASSES, A, B, C, D, E, F, G, AND H

NUMBER OF WRONG RESPONSES BY SINGLE WORDS

		Line 4					Line 5					Line 6					Line 7					Line 8					Line 9					Line 10					Line 10.5					Line 11		
Class	No.	camel	samuel	kind	lily	cruel	cowardly	dominoes	kangaroo	pansy	tennis	during	generous	later	modest	rhinoceros	claude	courteous	isaiah	merciful	reasonable	chrysanthemum	considerate	lynx	prevaricate	reuben	ezra	ichabod	ledger	parchesi	preceding	crocus	dahlia	jonquil	opossum	poltroon	begonia	equitable	pretentious	renegade	reprobate	armadillo	iguana	philanthropic
A	29	1	3	4	2	2	4	10	9	7	7	5	10	7	10	12	13	16	16	17	13	22	26	18	15	15	15	22	21	24	22	24	21	24	26	20	29	26	23	24	24	25	25	27
B	28	1			1	1	4	2	7	3	3	9	13	7	14	12	17	18	18	20	12	24	19	14	21	21	21	28	19	25	20	24	26	28	24	25	25	22	24	25	25	24	21	28
C	25	1	1	1	2		1	5	4	3	3	6	10	6	8	6	8	13	8	10	13	17	20	8	16	11	16	19	22	18	14	18	19	20	15	22	22	26	25	23	24	15	15	27
D	31	1		2	2	1	3	6	2	5	2	9	7	7	13	6	10	13	7	12	18	23	23	20	10	13	19	20	17	24	22	28	27	27	24	27	24	23	25	22	22	25	25	27
E	33		1			1	1	4	2	1	5	10	4	7	3	5	17	7	13	6	12	16	14	17	14	20	22	25	12	26	19	18	18	22	29	27	26	30	25	26	29	18	26	32
F	34		2		1	2	4	8	3	2	3	10	17	6	2	6	15	17	18	15	15	14	25	15	20	15	27	24	11	22	29	20	19	22	25	35	22	33	27	33	33	27	28	32
G	32	1		1	1	3	3	5	4	1	2	5	3	4	2	4	9	12	13	13	10	9	17	16	18	18	23	26	21	19	21	14	14	19	23	28	20	26	24	28	26	29	27	29
H	40			1		1	1	2	1		2		1		5		2	2	4	5	4	14	15	10	4	6	15	14	6	19	9	23	20	32	20	14	22	16	23	18	22	24	25	29
Number of wrong responses: by 5-word groups																																											
A				12				37					44					75					96																					
B				3				19					55					85					99																					
C				5				16					36					52					72																					
D				6				18					42					60					89																					
E				2				13					29					55					81																					
F				5				20					41					80					89																					
G				6				15					18					57					78																					
H				2				6					6					17					49					63																
Percentage of wrong responses																																											
A				8.3				25.5					30.3					51.7					66.2																					
B				2.1				13.6					39.3					60.7					70.7																					
C				3.9				12.8					28.8					41.6					57.6																					
D				3.9				11.6					27.1					38.7					57.4																					
E				1.2				7.9					17.6					33.3					49.1																					
F				2.9				11.8					24.1					47.0					52.4																					
G				3.8				9.4					11.3					35.6					48.8																					
H				1.0				3.0					3.0					8.5					24.5					31.5																

words cannot be exactly located by this series of five-word lines. For example, we may find records like the following:

NUMBER OF WRONGLY MARKED AND OMITTED WORDS IN EACH LINE BY EACH OF FIVE PUPILS, A, B, C, D, AND E

Line	4	5	6	7	8	9	10	10.5	11
Pupil A	0	0	0	0	2	0	3	4	1
" B	0	1	0	0	0	2	1	1	3
" C	0	0	0	0	2	0	5	3	2
" D	0	1	0	1	1	0	0	4	3
" E	0	0	0	1	2	0	3	5	2

Shall we call A's ability 7 or 9? Shall we call B's ability 8 or 10.5? Shall we call C's ability 7 or 9? Shall we call D's ability 10, disregarding the fact that he has made errors as far back as 5 and 7? Shall we call E's ability 7 or 9? With so few words in a line as five, it will often happen, as here with A, B, C, and E, that a single pupil will do better with some line than he did with its preceding and easier lines; or that other irregularities make the use of the highest line done with 0 or 1 error seem untrustworthy as a measure for the individual. In a class the chance special familiarity of one pupil with a given line will tend to be counterbalanced by the chance special unfamiliarity of some other pupil, so that for a class average reversals of the order of the percentages of errors almost never occur, but with a single pupil they occur perhaps once in five times. We can, it is true, use the pupil's score in the other lines to form a reasonable rough estimate for him. Thus, in the cases above, we might call A's ability 8; B's, 10; C's, 9; D's, 10; and E's, 9. And by a proper set of rules this can be done without introducing personal caprice. Samples of the records that will be obtained by such provisional use of Scale A for the individual pupils in a class are given in Table IV and Table V.* These tables show that the five-word scale is adequate to detect large individual differences within a class and to measure

* These records of Tables IV and V are not actual results with Scale A, nor, on the other hand, are they artificially made up. They are real results, but from the use of these words under somewhat different conditions than those of Scale A. So far as the points under discussion are concerned, they will serve as well as actual results with Scale A would.

TABLE IV

THE RESULTS OF USING THE VISUAL VOCABULARY SCALE A WITH A CLASS OF 40 PUPILS, 1, 2, 3, 4, 5, ETC. x = wrongly marked; 0 = omitted

	Line 4					Line 5					Line 6					Line 7					Line 8					Line 9					Line 10					Line 10.5					Line 11			
Pupil	camel	samuel	kind	lily	cruel	cowardly	dominoes	kangaroo	pansy	tennis	during	generous	later	modest	rhinoceros	claude	courteous	isaiah	merciful	reasonable	chrysanthemum	considerate	lynx	prevaricate	reuben	ezra	ichabod	ledger	parchesi	preceding	crocus	dahlia	jonquil	opossum	poltroon	begonia	equitable	pretentious	renegade	reprobate	armadillo	iguana	philanthropic
1																								0											0				0	0	0	0
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Total class	0	0	1	0	1	1	2	1	0	2	0	1	0	5	0	2	2	4	5	4	14	15	10	4	6	15	14	6	19	9	23	20	32	20	14	22	16	23	18	22	24	25	29
Class percentages for each line			1.0					3.0					3.0					8.5					24.5					31.5					54.5					50.5					65.0		

TABLE V

SUM OF WRONGLY MARKED AND OMITTED WORDS FOR EACH LINE OF SCALE A FOR EACH OF 40 PUPILS IN A CLASS, AND ESTIMATED ABILITY FOR EACH PUPIL

	Line 4	5	6	7	8	9	10	10.5	11	Estimated ability
Pupil 1					1	3	3	4	3	8
" 2					2		3	4	1	9
" 3					1	1	1	3	2	10
" 4				1	4	4	4	3	3	7
" 5		1				2	1	1	3	10
" 6				1	2	1	3	4	2	7
" 7				1	3	2	2	2	3	7
" 8			1		2		5	3	2	9
" 9		1		1	1			4	3	10
" 10							2			11
" 11		1				1	1	1	2	10.5
" 12				1	2	4	4	3	3	7
" 13		1			1	2	3	5	3	8
" 14				1	2	1	4	2	2	8
" 15	2	1	2	3	1	1	3	3	3	?
" 16				1	2	2	4	2	2	7
" 17					1	1	1	3	1	10
" 18				1	2		3	5	2	9
" 19					1	2	4	1	2	8
" 20					1	2	3	4	3	8
" 21			1		3	4	2	3	2	7
" 22					1	1	3	2	2	9
" 23				1		2	1	1	2	10
" 24				1	1	3	2	2	2	8
" 25							1	1		11
" 26				1			3	1	1	10
" 27							3	1	2	9
" 28							2	1	1	10
" 29		1			1	1	3	2		9
" 30				1	1	2	3	2	3	8
" 31			1	1	3	3	4	4	1	7
" 32					1	2	4	5	1	8
" 33					1	2	3	3	2	8
" 34				1	3	4	5	5	2	7
" 35					2	2	4	1	2	7
" 36			1	1	1	3	4	4	3	8
" 37					1	1	3	2	1	9
" 38					1	3	3	3	2	8
" 39							2	1	2	9
" 40									2	10.5
Total class	2	6	6	17	49	63	109	101	78	
Class percentages for each line	1.0	3.0	3.0	8.5	24.5	31.5	54.5	50.5	65.0	

them roughly if interpreted with common sense. But obviously we should use the five-word scale to compare individual pupils or to measure an individual's progress *only until a more extended scale is provided.*

The Administration of Scale A for Visual Vocabulary

Scale A is designed for classes of grades 4 to 8, inclusive, but may be used in grade 3, and is useful in the high-school to some extent. Fifty people can be measured at once. All that is required is that they should understand the general nature of the test, and should not be allowed to cheat. The former requirement is satisfied by means of the preliminary test shown on page 5. While this preliminary test is being taken the teacher should go about the class, and make sure that each pupil understands the general nature of the work. When the test is used in grades 4 and 3, this may require fifteen or twenty minutes of the teacher's time. In grades above 4, there will be very few pupils who will not, unassisted, get the idea. In any case, a pupil who has less then five errors and omissions in the first two lines (together) of the preliminary test, may be assumed to understand the general nature of the test. A pupil in grade 3 or above who has over ten words wrong or omitted in these two lines may be assumed *not* to understand the general nature of the test, and should receive special explanation with line 1, until he can independently do lines 2 and 3 with not over 6 words wrong or omitted, or until the teacher is convinced that he does not know the meanings of these printed words—cannot read them. In the latter case his ability is under 4 and there is no use in testing him with Scale A.

Cheating can be prevented by ordinary means, and by having the test-sheets handed in when the pupil has done his best, thus getting the test-sheets of the more gifted pupils out of reach of the others as early as possible. As a matter of fact, the location of a word and the recognition of the letter written under it is difficult at even a short distance, so that the prevention of cheating is probably easier here than in the ordinary examination.

The Scale A sheets should be given out with no further or other instructions than, " Read what it says. Do what it tells you to do. Do your best. Hand in your paper when you have marked all the words that you know." Make a note of the time when the sheets are given out.

When a pupil hands in his paper the teacher should observe

whether every word in line 4 is marked (whether rightly or wrongly marked is indifferent). If any word in line 4 is unmarked, the teacher should examine the paper to see if the pupil has left out the T's, Good's or Bad's entirely. If so, return his paper, calling attention to what remains to be done. Otherwise, take the pupil's sheet, being sure that his name is written on it, and record the time at which you receive it.

There will be a wide variation in the time required for pupils to finish. Pupils who finish the sheet should be told to study quietly. Half an hour should be allowed for the tests in grade 4; 25 minutes in grades 5 and 6; and 20 minutes in grades 7 and 8. Some pupils will finish long before that. A few may require more time. Special means may be used to get the measures of these last cases.

The time-record is not used in the measurement of vocabulary-range itself, but will prove instructive as a separate fact, and requires practically no labor. The pupils should be kept unaware of the fact that a time-record is being taken.

The scoring of the test-sheets can be done rapidly by means of a sheet of pasteboard, cut with strips to fit the lines and marked with the appropriate letters in the appropriate places. The strips being fitted over the words, the scorer can see at a glance the number of " wrongs " and omissions in a line and enter it at the right-hand margin.

When scored the results should be entered in a table like Table VI, the names being arranged alphabetically for easy reference.

The work of scoring may be economized by omitting the scoring and entering of lines which will not figure in the determination of the " 80 per cent right point." Thus, for an eighth-grade class, lines 4, 5, and 6 may almost certainly be neglected; for a fourth-grade class lines 10, 10.5 and 11 may almost certainly be neglected. A little experience will teach the scorer what lines he needs to score for a given class. What is needed, is the line whose percentage of error and omissions is closest to 20, the line next above, and the line next below it.

Attention has already been called to the fact that when the percentage of errors and omissions for a given line or degree of difficulty, say 6, is known, we can estimate what degree of diffi-

TABLE VI

SAMPLE SCORING SHEET

Results of Thorndike Visual Vocabulary Scale A.
Number of wrongly marked and omitted words in each line for each pupil.

Name	4	5	6	7	8	9	10	10.5	11

culty would give a percentage of exactly 20 for the class in question. The validity of such processes of estimating depends upon certain hypotheses that would be within the interest and knowledge of few save special students of educational measurements. I will not discuss these—nor attempt to tell how probable it is that they are applicable in the case of this scale. For all practical purposes of teachers and supervisory officers it is sufficient to state that the measure obtained by the following process of estimating will be somewhere near the truth and will on the average probably be nearer the truth than the measure got by any other one way that they would themselves devise.

The process is as follows:

A. If for any lines the class has a percentage of errors and omissions between 16 and 25, estimate the degree of difficulty which would give a percentage of 20 as follows:

For	15.0	add	.49	to the	line-number.	
"	16.0	"	.38	"	"	"
"	17.0	"	.28	"	"	"
"	18.0	"	.18	"	"	"
"	19.0	"	.09	"	"	"
For	21.0	subtract	.09	from the	line-number.	
"	22.0	"	.175	"	"	"
"	23.0	"	.255	"	"	"
"	24.0	"	.34	"	"	"
"	25.0	"	.42	"	"	"

A full table for any first-decimal value from 16 to 24 is given as Table VII.

B. If there is no line with a percentage of between 15 and 25, choose the two consecutive lines, the sum of whose percentages is nearest 40, estimate separately from each of these two percentages, using the scheme below or, in detail, Tables VIII and IX, and average the results.

For	8	add	1.41	to the	line-number.	
"	9	"	1.25	"	"	"
"	10	"	1.10	"	"	"
"	11	"	.96	"	"	"
"	12	"	.83	"	"	"
"	13	"	.71	"	"	"
"	14	"	.60	"	"	"
For	26	subtract	.50	from the	line-number.	
"	27	"	.57	"	"	"
"	28	"	.65	"	"	"
"	29	"	.72	"	"	"
"	30	"	.79	"	"	"
"	31	"	.87	"	"	"
"	32	"	.94	"	"	"
"	33	"	1.00	"	"	"
"	34	"	1.07	"	"	"
"	35	"	1.14	"	"	"
"	36	"	1.21	"	"	"
"	37	"	1.28	"	"	"
"	38	"	1.34	"	"	"
"	39	"	1.41	"	"	"

TABLE VII

FOR ESTIMATING THE DEGREE OF DIFFICULTY REQUIRED TO PRODUCE 20 PER CENT OF WRONGLY MARKED AND OMITTED WORDS, WHEN A GIVEN LINE OF SCALE A PRODUCES FROM 15 TO 25 PER CENT OF SUCH

	Add to line number		Subtract from line number
15.0	.49	20.0	.00
.1	.48	.1	.00
.2	.46	.2	.01
.3	.45	.3	.02
.4	.44	.4	.03
.5	.43	.5	.04
.6	.42	.6	.05
.7	.41	.7	.06
.8	.40	.8	.07
.9	.39	.9	.08
16.0	.38	21.0	.09
.1	.37	.1	.10
.2	.36	.2	.105
.3	.35	.3	.11
.4	.34	.4	.12
.5	.33	.5	.13
.6	.32	.6	.14
.7	.31	.7	.15
.8	.30	.8	.16
.9	.29	.9	.17
17.0	.28	22.0	.175
.1	.27	.1	.18
.2	.26	.2	.19
.3	.25	.3	.20
.4	.24	.4	.21
.5	.23	.5	.22
.6	.22	.6	.23
.7	.21	.7	.23
.8	.20	.8	.24
.9	.19	.9	.25
18.0	.18	23.0	.26
.1	.17	.1	.26
.2	.16	.2	.27
.3	.16	.3	.28
.4	.15	.4	.29
.5	.14	.5	.30
.6	.13	.6	.305
.7	.12	.7	.31
.8	.11	.8	.32
.9	.10	.9	.33
19.0	.09	24.0	.34
.1	.08	.1	.35
.2	.07	.2	.36
.3	.06	.3	.36
.4	.05	.4	.37
.5	.04	.5	.38
.6	.03	.6	.39
.7	.02	.7	.40
.8	.01	.8	.40
.9	.00	.9	.41
		25.0	.42

TABLE VIII

FOR USE IN ESTIMATING THE DEGREE OF DIFFICULTY REQUIRED TO PRODUCE 20 PER CENT OF WRONGLY MARKED AND OMITTED WORDS

	Subtract		Subtract		Subtract
		30.0	.79	35.0	1.14
25.1	.43	.1	.80	.1	1.15
.2	.44	.2	.81	.2	1.16
.3	.45	.3	.82	.3	1.16
.4	.45	.4	.82	.4	1.17
.5	.46	.5	.83	.5	1.18
.6	.47	.6	.84	.6	1.18
.7	.48	.7	.85	.7	1.19
.8	.48	.8	.85	.8	1.20
.9	.49	.9	.86	.9	1.20
26.0	.50	31.0	.87	36.0	1.21
.1	.51	.1	.87	.1	1.22
.2	.51	.2	.88	.2	1.23
.3	.52	.3	.89	.3	1.23
.4	.53	.4	.89	.4	1.24
.5	.53	.5	.90	.5	1.24
.6	.54	.6	.91	.6	1.25
.7	.55	.7	.91	.7	1.26
.8	.56	.8	.92	.8	1.26
.9	.56	.9	.93	.9	1.27
27.0	.57	32.0	.94	37.0	1.28
.1	.58	.1	.94	.1	1.28
.2	.59	.2	.95	.2	1.29
.3	.59	.3	.96	.3	1.30
.4	.60	.4	.96	.4	1.30
.5	.61	.5	.97	.5	1.31
.6	.62	.6	.98	.6	1.31
.7	.63	.7	.98	.7	1.32
.8	.63	.8	.99	.8	1 33
.9	.64	.9	1.00	.9	1.34
28.0	.65	33.0	1.00	38.0	1.34
.1	.66	.1	1.01	.1	1.35
.2	.66	.2	1.02	.2	1.35
.3	.67	.3	1.02	.3	1.36
.4	.68	.4	1.03	.4	1.37
.5	.68	.5	1.04	.5	1.37
.6	.69	.6	1.05	.6	1.38
.7	.70	.7	1.05	.7	1.39
.8	.71	.8	1.06	.8	1.39
.9	.71	.9	1.07	.9	1.40
29.0	.72	34.0	1.07	39.0	1.405
.1	.73	.1	1.08		
.2	.74	.2	1.09		
.3	.75	.3	1.10		
.4	.75	.4	1.10		
.5	.76	.5	1.11		
.6	.77	.6	1.12		
.7	.77	.7	1.12		
.8	.78	.8	1.13		
.9	.79	.9	1.14		

TABLE IX

FOR USE IN ESTIMATING THE DEGREE OF DIFFICULTY REQUIRED TO PRODUCE 20 PER CENT OF WRONGLY MARKED AND OMITTED WORDS

	Add		Add		Add
8.0	1.41	11.0	.96	13.0	.71
.1	1.39	.1	.95	.1	.70
.2	1.37	.2	.94	.2	.69
.3	1.36	.3	.92	.3	.68
.4	1.34	.4	.91	.4	.66
.5	1.32	.5	.90	.5	.65
.6	1.31	.6	.88	.6	.64
.7	1.29	.7	.87	.7	.63
.8	1.28	.8	.86	.8	.62
.9	1.26	.9	.85	.9	.61
9.0	1.25	12.0	.83	14.0	.61
.1	1.23	.1	.82	.1	.59
.2	1.22	.2	.81	.2	.58
.3	1.20	.3	.80	.3	.57
.4	1.19	.4	.78	.4	.56
.5	1.17	.5	.77	.5	.55
.6	1.16	.6	.76	.6	.53
.7	1.14	.7	.75	.7	.52
.8	1.12	.8	.74	.8	.51
.9	1.11	.9	.72	.9	.50
10.0	1.10				
.1	1.08				
.2	1.06				
.3	1.05				
.4	1.04				
.5	1.03				
.6	1.01				
.7	1.00				
.8	.99				
.9	.97				

The time required to measure a class of 40 pupils, record the results, and estimate the degree of difficulty that would give a percentage of 20 for errors and omissions, will vary from two to five hours, according to the skill of the measurer, and the clearness of the pupil's writing and the chance constitution of the class. It would seem to be well worth while for every school to make such a measurement at the beginning and end of the school year in grades 4 to 8.

LIMITATIONS AND DEFECTS OF SCALE A

The insufficient precision of the scale has already been noted, and the remedy, its extension by the use of other words of equal difficulty for each line. The task of finding other names of

flowers, animals, etc., etc., just as hard for children in grades 4 to 8 to read (well enough to mark them correctly in the test) as are, say, *chrysanthemum*, *considerate*, *lynx*, *prevaricate* and *reuben*, is a very long one. The task of constructing other graded series equivalent to lines 4, 5, 6, etc., of Scale A in difficulty, but with different sorts of words (say, colors, words about ships, words about war, words that mean distance, etc., etc.) is a still longer one. I am making such progress as I can with both of these tasks.

There is a special limitation to Scale A in that the very important prepositions, pronouns, conjunctions, auxiliary verbs and other words expressing relations do not figure in it. It is also, in general, hard to get these words into any scale made on the " checking by classes " principle. This limitation is not so serious as appears at first sight, for the chief importance of these words is as clues in sentence comprehension, and our scale for understanding the meaning of sentences and paragraphs, to be described later, tests knowledge of them rather thoroughly.

The scale, even when properly administered, will occasionally measure a mixture of general stupidity or indolence or mischief with inability to understand words. Probably no scale could be objective and convenient in use without suffering from this limitation.

The scale does not measure ability to understand the meaning of these printed words *in general*, or, *as they come in ordinary texts*, or *completely*, but only *to understand them well enough to classify them as required by the test.* This limitation is, however, a very, very desirable one. " To be able to read *during* " or " to understand the meaning of *poltroon* " is altogether too vague a statement for scientific use. What degree of understanding we require in our test is of almost no consequence, but that we should define objectively the degree of understanding that we do require is of very great importance. The scale does this admirably. The same general plan of test can also easily be adapted to very, very thorough knowledge of words and very, very fine discriminations between them.

A pupil has one chance in eight of being right by a mere guess. A chance of one or more in twelve is necessary for any workable test of this " checking by classes " type and when we

are concerned, as here, with the 20 per cent of error point, the small admixture of chance does little harm. It would be best theoretically to *force* guessing, making every pupil mark every word in some way, but for practical reasons I have decided against that method of administering the test. It seems probable that a school where guessing was encouraged would suffer as much by the resulting carelessness as it would gain by the chance successes. It is well to score omissions and " wrongs " separately. Of two schools with equal percentages of the two combined the school with more omissions would be slightly superior in word-knowledge.

The words on any one line are not of exactly equal difficulty. The differences are, however, not large enough to constitute a defect of practical importance.

The differences in difficulty between successive lines are not exactly equal, and their approximate equality depends upon the approximate truth of certain hypotheses about the distribution of word-knowledge in children of the same grade and about the comparative variability of the children in grades 4, 5, 6, 7 and 8 in respect to word-knowledge. For practical purposes, however, the use of the scale at its face-value will surely do little harm, and will probably do less harm than any other choice of values that the reader might feel inclined to make.

Some Special Advantages of Scale A

The scale measures ability to understand printed words, unconfused with ability to express oneself orally or in writing. Checking by classes is in this respect far superior to any form of definition test.

The test sheet forms the permanent record of the measurement so that thousands of measurements can be taken on one day and scored at leisure. The scoring can be done by unskilled labor.

The scale, when extended to include harder words, forms a means of measuring achievement and improvement from the third grade on through high school or college.

The scale can be applied in principle absolutely, and in concrete detail with slight modifications, to the measurement of extent of vocabulary in any foreign language. Such scales for French, German and Latin are being planned. We shall with

them not only be able to define the word-knowledge of a pupil, or class, but also to state it in terms of a standard attainment with the vernacular. For example, we shall be able to state that a given second-year class in German knew printed *German* words as well as an average third-grade pupil knows printed *English* words.

The scale can be increased by alternative series to any extent, so that dishonest special training on the scale-words can be made ineffective.

The Derivation of Scale A

The words of the scale were chosen from a much larger number which were given to about 2,500 pupils in grades 4, 5, 6, 7, and 8, of five different schools, in the form of Tests I, II, III, and IV, shown below, in April, May and June.

I

Write the letter **c** under every word that means a color. Write the letter **m** under every word that means a thing that makes music. Write the letter **w** under every word that means some thing that boys or girls wear. Write the letter **d** under every word that means some thing that a boy can do.

Remember— **c**, for colors
m, for things that make music
w, for things to wear
d, for things boys can do

red, green, guitar, hat, coat, run, work, play, shoe, jump, hide, piano, pink, cuff, shout, study, organ, reach, yellow, grasp, scream, collar, request, shiver, crawl, shirt, violin, violet, disagree, purple, inquire, scarlet, harp, flute, trumpet, practice, ramble, crimson, cornet, apron, mandolin, trespass, prevaricate, sweater, confess, ribbons.

II

Write the letter **a** under every word that is the name of an animal. Write the letter **t** under every

word that means a kind of tree or wood. Write the letter **b** under every word that means some kind of a book. Write the letter **g** under every word that means some kind of a game.

Remember— **a**, for animals
t, for tree
b, for books
g, for games

lion, tiger, pine, bible, oak, base-ball, primer, tag, deer, maple, snake, elm, willow, walrus, leopard, jack-straws, birch, tennis, giraffe, hickory, elephant, kangaroo, dictionary, dominoes, hemlock, croquet, gorilla, golf, novel, mahogany, walnut, encyclopedia, ledger, rhinoceros, parchesi, cypress.

III

Write a letter **g** under every word that means something good for a boy or girl to be. Write a letter **b** under every word that means something bad to be. Write a letter **s** under every word that means something to do with school. Write a letter **t** under every word like "now" or "when" or "before" that means something to do with time.

Remember— **g**, for good things
b, for bad things
s, for words about school
t, for words about time

liar, fair, lesson, then, lazy, steal, teacher, honest, clean, kind, never, writing, sneak, reading, polite, before, useful, stingy, murder, spelling, arithmetic, cowardly, cruel, afterward, whenever, truthful, modest, upright, geography, graduate, recess, rascal, drunkard, obliging, later, deceitful, during, scoundrel, promotion, grade, generous, criminal, torture, loyal, history, miser, reprobate, earlier, courteous, penmanship, merciful, forger, courageous, craven, renegade, poltroon, reasonable, examination,

considerate, deportment, discipline, defaulter, equitable, sycophant, preceding, philanthropic, hitherto, grammar, etymology, pretentious, courteous.

IV

Write a letter **n** under every word that means some boy's name. Write a letter **a** under every word that means some animal. Write a letter **f** under every word that means some flower. Write a letter **w** under every word like "lawyer" or "engineer" or "salesman" that tells what a man's work or occupation is.

Remember— **n**, for boys' names
a, for animals
f, for flowers
w, for occupations

John, Dick, Cat, Dog, Doctor, Rose, Teacher, Horse, Baker, Wolf, Daisy, Lily, Fred, Farmer, Monkey, Violet, Bear, Grocer, Tom, Elephant, Butter-cup, William, Peter, George, Camel, Clover, Samuel, Pansy, Blacksmith, Tulip, Carpenter, Paul, Edward, Mason, Painter, Leopard, Lilac, Tailor, Banker, Michael, Raccoon, Crocus, Geranium, Hiram, Plumber, Lizard, Hyacinth, Reuben, Claude, Giraffe, Lynx, Chrysanthemum, Joshua, Druggist, Peddler, Begonia, Zebra, Fuschia, Nathaniel, Wheelwright, Sloth, Rhinoceros, Kangaroo, Dahlia, Ezra, Broker, Orchid, Electrician, Heliotrope, Contractor, Ichabod, Opossum, Isaiah, Armadillo, Nasturtium, Iguana, Jonquil, Ulysses, Stenographer, Stevedore.

The criterion of approximately equal difficulty was that approximately equal percentages of pupils in each of grades 5, 6, 7, and 8 should mark the word correctly in these tests. How close the approximation is may be seen in Table X, which gives the percentages correctly marked in these grades for each word of the Scale A. It is, of course, true that classifying these words

TABLE X

RESULTS OF TESTS I, II, III, AND IV, AS GIVEN TO APPROXIMATELY 500 PUPILS IN EACH OF GRADES 5, 6, 7, AND 8

Word	Percentages correct			
	8th grade	7th grade	6th grade	5th grade
camel	100.0	99.3	98.4	96.4
samuel	99.6	99.3	98.6	96.6
kind	99.1	98.2	96.7	95.9
lily	98.5	98.4	97.9	96.2
cruel	99.6	99.3	99.3	96.8
cowardly	99.3	98.6	98.1	92.5
dominoes	98.5	97.2	94.1	87.2
kangaroo	99.5	98.4	95.2	89.4
pansy	97.7	97.7	96.8	90.6
tennis	98.3	95.4	95.9	90.2
during	95.5	95.4	91.1	77.3
generous	99.1	96.6	92.8	76.8
later	96.2	95.8	92.6	80.2
modest	93.7	93.6	87.8	77.1
rhinoceros	98.5	96.5	90.6	81.7
claude	94.2	90.8	80.3	61.0
courteous	97.6	94.0	88.5	62.4
isaiah	88.1	90.3	77.6	60.5
merciful	93.7	86.0	81.9	61.1
reasonable	95.1	90.8	85.4	65.5
chrysanthemum	86 6	76.6	70.6	50.9
considerate	90.6	82.1	71.7	44.3
lynx	86.1	76.3	65.3	51.4
prevaricate	88.4	81.4	73.7	52.9
reuben	84.8	80.5	70.4	47.3
ezra	71.3	65.1	52.6	32.3
ichabod	80.0	78.4	51.9	27.4
ledger	82.7	73.5	50.2	41.1
parchesi	71.1	61.9	50.9	37.6
preceding	79.1	69.9	45.7	34.1
crocus	58.0	51.3	43.5	31.4
dahlia	61.5	52.6	44.9	32.3
jonquil	55.7	44.2	39.1	33.2
opossum	52.4	46.2	39.3	23.3
poltroon	61.2	53.8	42.1	24.0
begonia	50.9	45.3	36.3	22.7
equitable	51.7	48.7	40.9	20.5
pretentious	47.0	39.6	30.4	23.4
renegade	51.0	40.9	23.4	18.0
reprobate	46.7	44.1	32.8	19.8
armadillo	40.1	38.9	41.4	20.4
iguana	38.7	35.8	30.1	13.7
philanthropic	42.0	30.1	22.4	17.7

under the conditions of Scale A may give somewhat different relative difficulties from those obtained with the words under the conditions of Tests I, II, III, and IV. This can be determined by experiment and the Scale can be amended if necessary. It is also the case that the large percentage of Jewish children in the schools at my disposal may have given values for the proper names that will need to be amended after wider use. As was stated at the beginning, this report is preliminary and provisional, and is made now only because the scale, though imperfect, is very much needed, and because the best way to improve it is through the information gained by using it.

Means of Improving the Scale

The extension of Scale A to a ten-word scale is a matter of time and labor. By using a test identical with the scale except that many other words not in Tests I, II, III and IV are added (e.g., as boys' names, Frank, Joseph, Richard, Walter, Edgar, Jacob, Malachi, Nehemiah, Matthew, Luke, Levi, Leo, Ivan, Jacopo, Petro, Eric, Edmond, Augustus, Nicholas, and the like), we shall find certain words equal in difficulty to those of some of the standard lines.

The first alternative scale now planned is for checking for

Parts of the body,
Tools,
Words about the sea and ships,
Parts of a house,
Words about church and religion,
Words about war and fighting.
Words about business and money,
Words about relatives and the family.

Tests VIII and IX will be given to about 2,500 pupils in grades 5, 6, 7, and 8 and such further studies made as become necessary. Another alternative scale will be worked out from results obtained from Tests XI, XII, and XIII. Words of difficulty 11.5, 12 and 12.5 will be sought also.

Words of difficulty 4.5, 5.5, 6.5, 7.5, 8.5 and 9.5 will be selected from the material now on hand and to be obtained this year, so as to increase the exactitude of the measurement of a class or individual.

VIII

Write a letter **b** under every word that means some part of the body. Write a letter **t** under every word that is the name of a tool. Write a letter **s** under every word that means something to do with the sea or ships. Write a letter **h** under every word that means some part of a house.

Remember— **b**, for parts of the body
t, for tools
s, for words about the sea and ships
h, for parts of a house

arms, ear, wave, door, eye, ship, hall, saw, bone, sail, hammer, wall, ocean, face, deck, window, axe, float, mast, chamber, foam, file, canoe, billow, cellar, knife, harbor, elbow, coast, attic, brain, bosom, basement, breast, launch, artery, chisel, shin, ceiling, brace, tongue, helm, garret, porch, gulf, kitchen, hatchet, fleet, balcony, gimlet, channel, casement, cargo, entry, cruise, embark, chimney, thigh, tiller, awl, alcove, ell, keel, piazza, cleaver, spine, screw-driver, dormer, bevel, cartilage, rudder, corridor, eaves, ratchet, kidney, hurricane, gable, lathe, cerebellum, lagoon, plane, mallet, leeward, hearth, vise, cranium, nautical, wainscot, adze, ligament, cornea, augur, navigable, patella, starboard, lymph, mariner, peritoneum, hull, jetty.

IX

Write a letter **c** under every word that means something about churches or religion. Write a letter **w** under every word about war or fighting. Write a letter **b** under every word about business or money. Write a letter **r** under every word like *father, son, wife,* about relatives or the family.

Remember— **c**, for words about church and religion
w, for words about war and fighting
b, for words about business and money
r, for words about relatives and the family

fight, brother, priest, pay, bottle, sister, buy, camp, flag, mother, money, defend, pray, sell, hymn, gun, father, captain, firm, owe, defeat, fort, aunt, merchant, cannon, conquer, tax, flank, psalm, finance, fortress, invest, bishop, monk, uncle, profit, creed, interest, guard, convent, nephew, freight, general, orphan, dagger, income, troops, marriage, worship, ownership, chaplain, nun, cousin, lease, colonel, abbott, niece, captive, altar, relative, military, insolvent, infantry, catholic, fortification, baptism, descendant, purchase, offspring, invader, indorse, commander, adoption, brigade, battery, curate, generation, cartridge, kinsfolk, blockade, cardinal, divorce, strategy, guarantee, garrison, rebate, buckler, catechism, installment, canonical, sentinel, forgery, citadel, patent, campaign, mortgage, cavalry, cloister, kinship, insurance, ordnance, episcopacy, genealogy, corporal, rampart, ecclesiastical, lieutenant, progenitor, friar, bulwark, indemnity, entrenchment, litigation, manoeuver, recruit, penitential, lineal, halberd, pontifical, adjutant, protestantism, legatee, monasticism, ammunition, negotiable, belligerent, peculation, canteen, chancel, monachism.

XI

Look at each word. Think what it means. If it means a bird, write a letter **b** under it. If it means a fish write **fi** under it. If it means an insect, like *fly*, or *ant*, or *bee*, write a letter **i** under it. If it means a four-legged animal, like *cat* or *dog* or *horse*, write a figure **4** under it.

Remember— **b**, for birds
fi, for fishes
i, for insects, like *fly* or *ant* or *bee*
4, for four-legged animals, like *cat* or *dog*

cow, dog, cod, ant, bear, robin, moth, lark, swallow, grasshopper, calf, fox, owl, wasp, boar, sparrow, donkey, goldfinch, camel, canary, shark, parrot, perch, hornet, thrush, raven, minnow, bullock, pigeon, goat, monkey, eagle, mule, cuckoo, trout, hawk, gull, herring, partridge, pike, grouse, smelt, buffalo, lice, giraffe, rhinoceros, bobolink, shad, beetle, panther, chickadee, halibut, flea, vulture, pickerel, mosquito, loon, quail, mackerel, locust, wren, stag, salmon, cricket, elephant, auk, flounder, kangaroo, termites, cockroach, plover, haddock, katydid, caribou, sardine, chamois, bittern, beagle, gibbon, coot, mullet, midge, lynx, oriole, gnat, tapir, curlew, pheasant, sloth, sturgeon, gazelle, cormorant, jackal, porcupine, snipe, carp, weevil, peccary, turbot, shrike, scorpion, cockchafer, aphis, flamingo.

XII

Look at each word. Think what it means. If it means something a boy can do with his feet and legs, write a letter **f** under it. If it means something a boy can do with his arms and hands, write **a** under it. If it means something a boy can do with his eyes, write **e** under it. If it means something a boy can do with his mouth and throat, write **m** under it.

Remember— **f**, for things done with feet and legs, like *run, jump, kick*
a, for things done with arms and hands, like *pull, take, reach*
e, for things done with eyes, like *see, look, read*
m, for things done with mouth and throat, like *cry, talk, drink*

kick, fold, step, hug, walk, read, reach, gaze, pull, wink, hop, dance, grasp, laugh, rub, leap, shake, roar, stand, grip, hurrah, wade, hurl, watch, skate, gather, skip, glare, seize, howl, plod, moan, sign, gasp, limp, stab, mourn, throw, slip, stare, trip, scowl,

write, hoot, scrub, observe, grin, patter, punch, gape, stamp, glance, recite, mock, prance, scour, groan, jeer, perceive, chirp, snatch, grumble, chant, blink, croak, glower, stumble, nibble, juggle, gargle, trample, scrawl, jabber, waltz, screech, twist, scuffle, pulverize, grunt, peer, pedal, gulp, pluck, murmur, twinkle, trudge, gurgle, scourge, scrutinize, halloa, pirouette, quaver, tread, throttle, waddle, pronounce, regurgitate, implore, shamble, clamor, hum, smite, whimper, prate.

XIII

Look at each word. Think what it means. If it means a color like *red* or *blue*, write a letter **c** under it. If it means something about number, like *six*, *all*, *half*, *many*, write **n** under it. If it means something about time, like *now*, *late*, *when*, *never*, write **t** under it. If it means something about direction or location, if it is a word like *east*, *north*, *up*, *down*, *above*, *behind*, write **d** under it.

Remember— **c**, for words about color, like *red*, *blue*, *green*
n, for words about number, like *more*, *five*, *many*
t, for words about time, like *then*, *often*, *early*
d, for words about direction and location, like *front*, *east*, *here*

last, west, here, half, early, brown, many, below, there, month, across, year, noon, back, forty, gray, first, right, pair, left, green, morning, whole, pink, while, where, afternoon, minute, gold, edge, soon, outside, some, more, evening, plum, inside, beneath, odd, even, every, yellow, monday, toward, dozen, june, group, future, buff, from, count, nine, forenoon, purple, middle, plural, tuesday, instant, couple, score, crimson, april, each, during, interior, forward, wednesday, never, december, singular, center, hazel, outward, several, scarlet, violet, double, frequent, chestnut, august, ruby, either, rarely, recent, overhead,

million, tan, exterior, quartet, seldom, tawny, olive, january, margin, numerous, immediate, bounding, february, encircling, september, lilac, numeral, crowd, gradual, roan, quadruple, opposite, minority, november, russet, diagonal, october, faun, formerly, garnet, overhanging, multitudinous, lasting, meantime, duplicate, continue, intervening, perpendicular, henceforth, elevated, lavender, forthwith, sextet, incessant, azure, surmounting, majority, previous, interim, thereabouts, plurality, narrow, perennial, frontal, treble, repeatedly, constantly, carmine, neighboring, parallel, contemporary, vertical, mauve, decade, emerald, magenta, octile, ecru, contiguous, quintet, ensuing, horizontal, evanescent, sepia, conterminous, multiple, integer, vermillion, eternal, turquoise, transverse, century, sexagesimal, ephemeral.

A Scale for Measuring the Understanding of Sentences and Paragraphs

Mere word knowledge is much less important than the ability to get the message carried by a continuous passage. Competent judges would rate the latter as from sixty to ninety per cent of the total result to be sought by the elementary school in the teaching of reading. Probably no other one scale for educational measurements is so important as a scale for measuring the understanding of sentences and paragraphs.

The desiderata of such a scale are, of course, the general desiderata of objectivity, definiteness, exactitude, convenience, and commensurability. The special difficulties in this case are to measure ability to understand unmixed with ability to express and to do so without ambiguity and at small time-cost. I have experimented along two lines,—with tests like A, B, C, D, E, and F below, and with tests like V, VI, and X.

A

Read this and then write the answers to 1, 2, 3, 4, 5, 6, 7, and 8. Read it again as often as you need to.

Tom gave a gray cat to Mary. She gave him a black dog.

1. What did Tom give the girl ?.....
2. What did the girl give Tom ?.....
3. What was the girl's name ?.....
4. What color was the dog ?.....
5. What color was the cat ? .....
6. Was the dog the same color as the cat ?.....
7. Did Mary give Tom anything ?.....
8. Who gave the cat to Mary ?.....

B

Read this and then write the answers to 1, 2, 3, 4, 5, 6, 7, and 8. Read it again as often as you need to.

John had two cents. Tom had four cents. Will had six cents. Mary had ten cents.

1. Who had the most?.....
2. Who had the least?.....
3. Did Tom have more than Will?.....
4. Did Mary have more than Will?.....
5. How many cents did John have?.....
6. How many cents did the girl have?.....
7. Which boy had the most?.....
8. Did Tom have two cents more than John?.....

C

Read this and then write the answers to 1, 2, 3, 4, 5, 6, 7, and 8. Read it again as often as you need to.

John went to the store to work and Will went to school, but Fred went to the park and played ball. Will and Fred came back at four o'clock. John did not come back until after six o'clock.

1. Where did Will go?.....
2. What did Fred do at the park?.....
3. Where did John work?.....

4. Who came back at four o'clock ?.....

5. Who came back later ?.....

6. What time was it when Fred came back ?.....

7. Where did one of the boys play ball ?.....

8. Did John come back at the same time as Will ?....

D

Read this and then write the answers to 1, 2, 3, 4, 5, 6, 7, and 8. Read it again as often as you need to.

John had two brothers who were both tall. Their names were Will and Fred. John's sister, who was short, was named Mary. John liked Fred better than either of the others. All of these children except Will had red hair. He had brown hair.

1. Was Will tall or short ?.....

2. Was John's sister tall or short ?.....

3. Which of his brothers and his sisters did John like best ?.....

4. Was Fred tall or short ?.....

5. Who had brown hair ?.....

6. Who had red hair ?.....

7. How many brothers had John ?.....

8. What was his sister's name ?.....

E

Read this, and then write the answers to 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10. Read it again as often as you need to.

Long after the sun had set, Tom was still waiting for Jim and Dick to come. "If they do not come before nine o'clock," he said to himself, "I will go on to Boston alone." At half past eight they came, bringing two other boys with them. Tom was very glad to see them and gave each of them one of the apples he had kept. They ate these and he ate one too. Then all went on down the road.

1. How many boys are told about?.....

2. For whom was Tom waiting?.....

3. When did they come?.....

4. Where do you think they were going?.....

.....

5. How many apples did they eat?.....

6. What did they do after eating the apples?.....

.....

7. How did Tom feel when he saw Jim and Dick?...

.....

8. Who else came besides Jim and Dick?.....

.....

9. How long did Tom say he would wait for them ?..

.....

10. What happened after the boys ate the apples ?....

.....

F

Read this and then write the answers to 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10. Read it again as often as you need to.

It may seem at first thought that every boy and girl who goes to school ought to do all the work that the teacher wishes done. But sometimes other duties prevent even the best boy or girl from doing so. If a boy's or girl's father died and he had to work afternoons and evenings to earn money to help his mother, such might be the case. A good girl might let her lessons go undone in order to help her mother by taking care of the baby.

1. Must a good boy always do all his school work ?..

.....

2. Will a good girl sometimes fail to get all her lessons ?.....

3. What are some conditions that might make even the best boy leave school work unfinished ?.....

.....

4. Answer the question just asked, supposing it to be a girl instead of a boy?.....

.....

5. What might a boy do in the evenings to help his family?.....

6. How could a girl be of use to her mother?.....

.....

7. What is it that might seem at first thought to be true, but really is false?.....

.....

8. What sort of boys and girls does the paragraph tell about?.....

9. What might be the effect of his father's death upon the way a boy spent his time? .....

.....

10. Who is mentioned in the paragraph as the person who desires to have all lessons completely done?..

.....

V

Do what it says to do

1. Write the letter *a*.

2. If two and two are five, write the letter *b*. But if two and two are four, write the letter *c*.

3. If two and two are more than two and four, write the letter *d*, but if they are less than two and four, write the letter *e*.

4. If the word that you see here after *cat* is *dog*, cross it out. *cat dog.*

5. Cross out all words on the next line which have both *e* and *t* in them.
meat dress tack Peter guess tree.

6. If any word on the two short lines below has an *a* and also a *b* in it, do not cross it out. If it has an *a* in it and not any *b* in it, cross it out.

   bull tremble breakfast ask

   beat tear board animal

7. Look at these words. *idle tribe inch it ice ivy tide true tip top tit tat toe.*
Cross out every one of them that has an *i* and has not any *t* (*T*) in it.

8. If the first word that you saw in this line had an *a* in it, cross out every *a* in that line.

9. Look at these words. *light white bright spite piteous city cited*

Whenever in those words you see the letter *t* with an *i* on one side of it and an *e* on the other, draw a line under all three.

10. Look at the two short lines below. Unless you see a word which has the letters *t*, *h* and *e* all in it, do not do anything. But draw a line under any such word and draw a line over the word that comes next after it.

when then up down these and those

if but were not never there yet

VI

Do what it says to do

1. Write the letter *n* three times.
2. Draw a line under the word that begins with *w*.
   big dog sick well had
3. Make the shorter line longer. —— ——
4. How many are two and one?
5. How many ears has a cat?
6. Put a dot over the *i* in pig. *Pıg.*
7. Put two dots in the square.
8. Put one dot in the middle circle. O O O
9. Draw a line below the square. O

10. Draw a line around the circle.

11. Write your name.

12. Copy the second of these words. *big bag beg*

13. Copy each of these words. *rose nose goes*

14. Cross out the smallest dot. • . •

15. Cross out the largest d. d d d d

16. Cross out each *a* in these words. *Advantage derivation.*

17. Which is the coldest—spring, summer, autumn or winter?.....

18. Which is the longest—an inch, a mile, a foot, or a yard?.....

19. When is it warmest—in spring, summer, autumn or winter?.....

20. Which moves most rapidly—a snail, an automobile, a horse, or a chicken?.....

.....

.....

X

A. Draw a line under every 4 in these two lines of numbers:

5 4 7 4 9 1 2 6 3 4 4 8 3 4 2 9

2 9 4 1 4 7 5 4 6 2 3 4 1 4 4 8

B. If the first figure is 4, draw a line under every 4 in this line; but if the first figure is 6, draw a line over every 9:

6 2 4 9 1 7 9 3 4 8 4 5 9 5 6 4 2 9 1 7

C. In these four lines, draw a line under every 5 in the first line and under every 6 in the second line. Draw a line under only the first and last figures in the third line. Do nothing at all to the fourth line:

7 2 9 6 5 3 1 4 5 8 2 5 1 7 6 4

3 5 6 8 1 5 7 6 4 6 9 2 6 3 7 5

8 2 9 6 5 1 7 6 4 2 3 7 5 9 6 2

5 4 7 3 8 2 6 5 7 1 5 2 6 3 6 4

D. In these lines, when you see a figure 4 between a 2 and a 9, draw a line under it. But when you see a 4 between a 6 and a 3, draw a line over it:

5 1 6 8 2 4 9 1 7 4 3 2 4 9

8 5 6 4 7 5 1 4 2 4 7 2 4 9

E. In these two lines draw a line under every 5 that comes just after a 2, unless the 2 comes just after a 9. If that is the case, draw a line under the next figure after the 5:

5 3 6 2 5 4 1 7 4 2 5 7 6 5 4 9 2 5 3 8 6 1 2 5

4 7 3 5 2 3 9 2 5 8 4 7 9 2 5 6 1 2 5 7 4 8 5 6

F. In these three short lines, when you see an 8 without a 3 just after it, draw a line under the figure that comes just before the 8:

8 4 2 8 3 7 1 8 5 9 8 2

5 6 8 3 1 2 8 3 5 4 8 0

8 3 2 8 9 1 6 8 7 4 8 3

G. In the first of these four lines, draw a line under every 6 except the first and the last in the line.

In the second of these four lines, draw a line under as many of the 6's as you did in the first line.

In the third line, mark only the first and the next to the last 6.

In the fourth line, mark only where there are two 6's that come side by side:

6 2 1 9 6 7 4 6 3 8 2 1 6 7 6 3 9 0 1 6

5 6 7 6 9 1 3 6 2 7 6 1 8 6 3 7 6 4 2 6

6 3 8 7 9 6 7 1 6 9 4 6 6

6 1 5 6 6 7 2 9 6 1 8 4 6 3 6 6 7 1 6 6 9 4 3 6 8 2

In the A, B, C, D, E, F type of measure, the ability to understand a paragraph and certain questions asked is measured by the correctness of verbal responses, in much the same way as is done in the daily reading of a school. Special care is taken, however, to make the task of expression very easy. In C, for example, the pupil has merely to write " To school," " Played ball," " In a store," " Will and Fred," " John," " Four," "At the park," and " No," or even simpler phrases that give the facts. The task of expression is harder with F, but relatively to the reading task, it is easy. Special care is also taken to make the scoring easy. Work that engages a pupil for thirty minutes can be fully scored in three minutes or less. Special care is also taken to measure understanding as conditioned by

the constructional difficulties of a paragraph rather than by the difficulties of single words. Even in F, for example, only common words are used.

In the V, VI, X type of measure the ability to understand a sentence or short paragraph is measured by the correctness of a response that may not be verbal at all. In X, the pupil is made familiar with the work of checking numbers in an easy case and then is given sets of instructions where the response is easy enough to make, provided he has understood the instructions, and keeps them in mind.

With the knowledge that has come from experimentation with these tests, I could now improve them. Questions with two possible answers only (like B 3, 4, 8; D 1, 2, 4; F 1, 2) I should now omit. The original plan was that the reading of the paragraph and all the questions about it would be used as a unit, in which case the half-chance by chance for a single element did no harm. But it now appears that we can measure in smaller units. I should make it clearer that the questions were to be answered from the paragraph. For example, F 7 might better be "What is said in the paragraph to seem at first thought to be true, but really to be false." The marking tests should be preceded by some with even simpler instructions; V 5 should be made less ambiguous; V 1, V 2 and V 3 should probably have "in the circle" added in each case with a circle printed at the right.

The general plan, however, of passage-question measures and response by marking letters, numbers and the like seems entirely satisfactory, and it seems certain that the construction of many graded series similar to the A-F, or X, or V series and the selection from among them of an exactly graded series on the basis of results from several thousand pupils will produce a very useful scale.

Indeed, even the provisional and incomplete scale achieved with very limited time and facilities is useful. With all its faults, it is a convenient means for measuring the achievement of a class or a school-system in silent reading. This beginning of a scale is as follows:

SCALE ALPHA. FOR MEASURING THE UNDERSTANDING OF SENTENCES

SET *a* OR 4

Read this and then write the answers. Read it again as often as you need to.

John had two brothers who were both tall. Their names were Will and Fred. John's sister, who was short, was named Mary. John liked Fred better than either of the others. All of these children except Will had red hair. He had brown hair.

1. Was John's sister tall or short?.....

2. How many brothers had John?.....

3. What was his sister's name?.....

SET *b* OR 6

Read this, and then write the answers. Read it again as often as you need to.

Long after the sun had set, Tom was still waiting for Jim and Dick to come. "If they do not come before nine o'clock," he said to himself, "I will go on to Boston alone." At half past eight they came bringing two other boys with them. Tom was very glad to see them and gave each of them one of the apples he had kept. They ate these and he ate one too. Then all went on down the road.

1. When did Jim and Dick come?.....

2. What did they do after eating the apples?.....

.....

3. Who else came besides Jim and Dick?.....

.....

4. How long did Tom say he would wait for them?

.....

5. What happened after the boys ate the apples?.....

.....

SET *c* OR 8

Read this and then write the answers. Read it again as often as you need to.

It may seem at first thought that every boy and girl who goes to school ought to do all the work that the teacher wishes done. But sometimes other duties prevent even the best boy or girl from doing so. If a boy's or girl's father died and he had to work afternoons and evenings to earn money to help his mother, such might be the case. A good girl might let her lessons go undone in order to help her mother by taking care of the baby.

1. What are some conditions that might make even the best boy leave school work unfinished?.....

.....

2. What might a boy do in the evenings to help his family?.....

3. How could a girl be of use to her mother?.....

.....

4. Look at these words: *idle, tribe, inch, it, ice, ivy tide, true, tip, top, tit, tat, toe.*
Cross out every one of them that has an *i* and has not any *t* (T) in it.

SET *d* OR 10

Read this and then write the answers. Read it again as often as you need to.

It may seem at first thought that every boy and girl who goes to school ought to do all the work that the teacher wishes done. But sometimes other duties prevent even the best boy or girl from doing so. If a boy's or girl's father died and he had to work afternoons and evenings to earn money to help his mother, such might be the case. A good girl might let her lessons go undone in order to help her mother by taking care of the baby.

1. What is it that might seem at first thought to be true, but really is false?.....

.....

2. What might be the effect of his father's death upon the way a boy spent his time?.....

.....

3. Who is mentioned in the paragraph as the person who desires to have all lessons completely done?

.....

4. In these two lines draw a line under every 5 that comes just after a 2, unless the 2 comes just after a 9. If that is the case, draw a line under the next figure after the 5:

5 3 6 2 5 4 1 7 4 2 5 7 6 5 4 9 2 5 3 8 6 1 2 5
4 7 3 5 2 3 9 2 5 8 4 7 9 2 5 6 1 2 5 7 4 8 5 6

This scale is available for grades 3 to 8. The tests above are given after the preliminary test shown below. During the preliminary test the teacher explains the general nature of the test to any individual who fails to succeed with the preliminary tests. Time will be saved by announcing that the answers to the questions need not be in complete sentences and that spelling "does not count"—that the pupils need write only what will show that they understand the sentences.

The time allowed should be enough for each pupil to do all that he is able to do. I suggest 30 minutes, though 20 is probably ample. As with the Vocabulary Scale, the test sheets may be handed in when completed, the time being secretly recorded, or all may be collected at the time-limit. Each plan has its advantages.

Preliminary Test for Use Before Scale Alpha

Read this and then write the answers to the questions.

Tom gave a gray cat to Mary. She gave him a black dog.

What was the girl's name?.....

What color was the dog?.....

What color was the cat?.....

Read this and then write the answers to the questions.

Your nose is on your face. Your fingers are on your hands. Your teeth are in your mouth.

Where are your fingers?.....

Where is your nose?.....

Where are your teeth?.....

Read this and then write the answers to the questions?.....

Dick took a bat. Fred took a ball. Will took six cents.

What did Will take?.....

What did Fred take?.....

What did Dick take?.....

In an ideal scale for measuring achievement in reading the responses will be clearly either right or wrong even to an unskilled scorer. It is, however, difficult to attain this desideratum in the case of very hard reading without sacrificing other desired qualities.

In the case of tests A, B, C, and D, this end is substantially attained. A person who could not even read the paragraphs might be taught to score them. All that is necessary is to note that in C4, "Will" or "Fred" should be called wrong, and

that in D6 either "all except Will" or "John, Mary and Fred" should be called right.

In the case of Test E, there is required some judgment on the part of the scorer. The general intent should be to require an answer that proves that the pupil has understood the passage perfectly. In calculating values for the scale, for example, "down the road" instead of "Boston" as an answer to E4 is scored as wrong, "before nine o'clock" is called wrong as an answer to E9, "they went to Boston" and "they went away" are called wrong as answers to E10.

In the case of some of the questions of Test F still more judgment is necessary. The plan which was followed in deriving the scale was to have each response scaled from zero to four (or five in some cases) according to the following plan. The standard of correctness was taken as 4 or 5, though it would be possible to use a less rigorous standard.

PLAN FOR SCORING TEST F

F. 1. Yes 0
Yes do all 0
Yes if he wants to be promoted 0
Yes but sometimes 0
Yes he always does 0
He must do all his work 0
He must do all the lessons that the teacher wishes 0
All that the teacher asks him 0
Yes but other duties prevent them 2
Yes if he has not anything to keep them home 2
Yes if both parents are living 3
If it is possible 3
No 4
No if the boy's father died 4
No sometimes his father died and he had to earn money etc. 4

F. 2. No 0
No she never will 0
Yes if she is careless 0
A good girl will not fail 0
If it is impossible 3
Yes 4
Yes when it is important 4

Yes if she has to help her mother 4
Yes sometimes she minds the baby 4
Yes to help her mother 4
Sometimes 4
Sometimes a good girl fails to get all her lessons 4

F. 3. Playing ball, etc. 0
Going with bad boys 0
To work 1
To earn the money 1
Have to work out to get money 2
Because to help their mother 2
If he has to work for a living 4
If he has to work afternoons and evenings to help his mother 4
When the father dies 4
When their parents died 4
If his father died and to work 4
If his father died or if sick 4
His father might die 4
His father may died 4
If his father died he has to work 4
If his father or mother died 4
If a boy's father dies he has to earn money for his mother 4
When some one dies in their family 4
Help support the family 4
The condition is in case his father died 5
If his father died he might have to go to work 5
If his father died he might have to work 5

F. 4. Its a boy 0
It supposed to be a boy 0
By going with a bad girl 0
Playing with a doll etc 0
She would have to go boarding and have to work 0
Tend the baby 2
Take care of baby 2
To mind a baby 2
She would take care of her baby 2
The girl sometimes minds the baby 2
To help her mother by taking care of the baby 2
To help her mother and take out the baby 2
Leave her lessons undone and help her mother 2
To wash dishes if the mother is sick 2
To earn money by sewing 2
If she had to help her mother 4

She might have to mind the baby 4
A good girl may leave her lessons to take care of the baby 4
A good girl might let her lessons go undone to mind the baby 4
Mother may of died 4
If her mother died 4
Her mother might die and she would have to take care of the house 4
When the mother is sick 4
Her father might die 4
The same as for question 3 4
If her father died 4
If his father died or is sick 4

F. 5. Be good 1
To do his lessons 1
Help with things in the house 2
Prepare the table 2
To do the work his father wish him to do 2
Go to the store 2
Help his mother 2
Help his father 2
Work 4
To work 4
Work afternoons and evenings 4
Work in the evening 4
Work to earn money for mother 4
Work and earn some money 4
He might have to work 4
A boy might work 4
Go out and work 4
By working 4

F. 6. Lazy 0
Ficks the beds 2
By being good 2
Help her mother 2
Work 2
To take out the baby 3
By washing dishes, cleaning 3
Wash dishes 3
Help her mother wash the dishes 3
By helping her to wash the dishes 3
Wash and clean the house etc 3
Help clean the house 3
To take care of the house 3
Take care of the baby 4

To take care of the baby 4
Mind the baby 4
By minding the baby 4
She could take care of the baby 4
Care for the baby 4
By taking care of the baby 4
To do house work or mind the baby 4

F. 7. To true 0
Go to the home of the boy and see if it is true 0
To leave school and work 0
To stay home from school and not work 0
Lessons undone and loafing and truancy 0
When you are dressed different 1
When a boy or girl thinks he must work very hard 1
That his father died and did not 2
That his money was stolen but he really spent it 2
The boy said he lost his money but spent it 2
To say he did his lesson but did'nt 2
A lie 2
That they should do their work 3
To do all the work that is asked 3
It seems that all children must do all work 4
That everybody must do their lessons 4
That a good boy or girl always does their lessons 5
A good boy or girl to do all their school work 5
Every boy or girl might do all the teacher wishes 5

F. 8. Good and false 0
Bad 0
What they have to do 0
What has no father or mother 2
Without parents 2
Good boys and girls 4
A good boy and a good girl 4
All good boys and good girls 4
School boys and girls 4
Poor 4
It seems to be a poor family 4

F. 9. By the boy not working if his father lost his job
By not doing what his father told him 0
Sickness 0
Makes the father work 0

Loafing and doing nothing 1
Loafing and not working 1
Go with bad companions 2
Bad and not doing his lessons 2
Idling 2
Go away and not come back till night 2
To take the job that his father had 2
It might be good effect 3
Work 3
A boy would work 3
He had to work afternoons and evening 3
To work afternoons and evening 3
Working or making his living 3
To spend working 3
He would have to work all the time 4
He would work instead of going to school 5
He might have to work to support the family 5
He would have to go out to work 5
He would have to work 5
He would have to work afternoons and evenings 5

F. 10. A boy 1
A boy and girl 1
A boy or girl 1
The boy 1
The child with both parents 1
A good person 1
Good boys and girls 2
A good boy and a good girl 2
The best boys and girls 2
The best boy and girl 2
Who cares about his lessons 2
The teacher 5

In the case of tests V and X, scoring may follow the rules given below, the intent being to score as correct any response which indicates with fair surety that the pupil read and understood the directions. Cancellation of everything required by the directions with no wrong cancellations is not to be demanded, for even a highly educated adult will not attain such perfection in the test. The test is of ability to read, not of precision in perceiving certain letters or numbers.

Test V. 1. *a* is right, anything else is wrong.
" 2. *c* is right, anything else is wrong.
" 3. *e* is right, anything else is wrong.
" 4. Either "dog" crossed out is right, anything else is wrong.
" 5. Two or more e-t words checked and no others checked = right; or all four e-t words checked with one wrongly checked word = right.
" 6. Any two of the right words checked and no wrong words checked = right; or all three right words checked and one wrong word checked = right.
" 7. Three or more rightly checked with no word wrongly checked = right; or all four words rightly checked with not over two words wrongly checked = right.
" 8. Nothing done is right.
" 9. At least three words rightly checked with not over one word wrongly checked (the lines being drawn under all three or approximately so) = right.
" 10. The omission of two marks or the improper placing of two out of the eight is to be allowed without depriving the individual in question of a score as right.

Test X. A. If at least eight of the 4's are underlined and not over two figures wrongly marked, call right.
" B. If at least three of the 9's are overlined and not over one figure is wrongly marked, call right.
" C. Line 1. At least two 5's and no wrongly marked figure.
" C. Line 2. At least three 5's and no wrongly marked figure.
" C. Line 3. First and last figure underlined and no others.
" C. Line 4. Nothing at all done.
" D. If at least two of the 249's are properly marked and no other figure is marked, call the response right.
" E. If at least three of the "25" sequences and at least two of the "925" sequences are properly marked and if there are no wrongly marked figures, call the response right.
" F. If there are not over two omissions or wrongly marked figures, call the response right.
" G. Line 1. At least three rightly marked and no wrongly marked.
" G. Line 2. Exactly as directed.
" G. Line 3. Exactly as directed.
" G. Line 4. At least two of the 66's and no wrongly marked figures.

The most economical method of measuring a class is to arrange the papers alphabetically. Score first the set which one thinks will come nearest to 80 per cent of correct responses for

TABLE XI

RECORD SHEET FOR MEASUREMENT BY SCALE ALPHA

Number of wrong responses

Name	Set *a* or 4	Set *b* or 6	Set *c* or 8	Set *d* or 10	

the class, enter the results on a scoring sheet like that shown in Table XI, compute the result for the class, and then score the set above or below it in difficulty if necessary. The difficulty required to get just 20 per cent of wrong responses may be estimated from the actual percentages obtained with the sets of the scale by using Tables VII, VIII and IX, but multiplying the table-entry by 2 in every case, since the difference between the consecutive " sets " 4, 6, 8, 10 of Scale Alpha is twice the difference between two consecutive " lines " in Scale A. On account of the small number of "sets," or steps of the scale, the estimate may be made from the percentage nearest to 20, if there is one between 12 and 30. If there is no such, the two whose sum comes nearest to 40 may be used.

I illustrate below the treatment of the scores in the case of fifteen boys, all twelve years old, and all from the same school, five being in grade 4 A, five in grade 6 A, and five in grade 7 B. The detailed scores were as in Table XII.

TABLE XII

DETAILED SCORES OF FIFTEEN 12-YEAR-OLD PUPILS BY SCALE ALPHA

Score recorded in Scale X for each element

		a			b					c				d			
Pupil	Grade	1	2	3	1	2	3	4	5	1	2	3	4	1	2	3	4
A	4A		x			x			x	x	x	x	x	x	x	x	x
B	"									x	x	x	x	x	x	0	x
C	"				x		x	0		x	x	x	x	x	x	x	x
D	"						x		x	x	x	x	x	x	x	x	x
E	"									x	x	x		0	x	x	0
F	6A									x	x	x		x	x	x	
G	"												x			x	x
H	"												x		x		x
I	"											x	x	x	x		x
J	"									x		x	x	0	x		x
K	7B												x	x			
L	"														x	x	
M	"								x				x	0	x	x	x
N	"														x		
O	"														x		x

The percentages of wrong responses for each group for each set were:

	Set a	Set b	Set c	Set d
4 A group	6.7	28.0	95	100
6 A group	0	0	50	65
7 B group	0	4.0	10	50

The degree of difficulty required to produce 20 per cent of wrong responses would then be (calling the difficulty of Set a, 4; that of Set b, 6; that of Set c, 8; and that of Set d, 10) as follows:

4 A group—about 4.7
6 A group—about 6.5
7 B group—about 9

It is clear from the above, first, that the scale is adequate to show differences in reading ability, but, second, that intermediate sets are much needed.

Limitations to Scale Alpha

So far, except for a warning at the beginning of the section, Scale Alpha has been described as if the degrees of difficulty (4, 6, 8 and 10) were exact, and as if the different elements of each set were equally difficult to respond to correctly. As a matter of fact, however, it will require an enormous amount of labor to determine at all exactly the relative degrees of difficulty of these different elements; and the 4, 6, 8 and 10 are not much better than convenient guesses. Indeed, I know that the values for these sets will *not* be at all exactly 4, 6, 8 and 10, that the difficulty of the fourth set will *not* be exactly two and a half times that of the first. By using fractional numbers I could approach nearer the truth. But I have left the estimates as convenient whole numbers in order to facilitate the understanding and use of the scale.

I have records from only about 1100 pupils, some of whom were not tried with all the elements finally retained in the scale. There will be required tests of over four thousand pupils, each with fifty or sixty response elements, in order to locate four or more "sets," the elements of each being equal in difficulty within five per cent and the increases in difficulty from one set to the next being equal within five per cent.

Future work will improve the scale greatly in these respects, but even as it stands, the resulting comparison of two classes will be much fairer and more exact than probably even the most capable supervisor of reading would arrive at by ten hours of oral questioning. And the results will be readily comparable with thousands of others obtained with other classes by other supervisors, and will be at once understood by anybody who knows the scale—a most desirable feature, which no ordinary school examination possesses. Consequently, though I have presented Scale Alpha chiefly as an illustration of the sort of scale to be constructed, its use even now will do much more good than harm. It will do no harm if we remember that it is provisional, that 4, 6, 8 and 10 may well turn out to be 4.8, 6.3, 7.7 and 9.5, or 5, 6, 8 and 9, or 6, 7, 8.5 and 10, or other values differing rather widely from the 1, 1½, 2, 2½ ratios.

I may say that the equality in difficulty of the different

elements of the same " set " is somewhere nearly sufficient for practical purposes, the facts being as shown in Table XIII.

TABLE XIII

DATA CONCERNING THE DIFFICULTY OF EACH ELEMENT OF EACH SET OF SCALE ALPHA: THE PERCENTAGE OF CORRECT RESPONSES FOR CERTAIN GROUPS TESTED

		8th grade pupils in school B (n = 110)	7th grade pupils in school B (n = 102)	6th grade pupils in school B (n = 130)	7th grade pupils in school A (n = 136)	6th grade pupils in school A (n = 132)	5th grade pupils in school B (n = 95)	5B grade pupils in school A (n = 105)	5A grade pupils in school A (n = 105)	4th grade pupils in school A (n = 105)	3rd grade pupils in school A (n = 105)
Set a	1	97	99	98.5	97	97.7	97.9	97.1	99	96	94.8
	2	98	99	97.7	96	96.2	94.7	97.1	100	95	93.8
	3	100.5	99	100	98.9	98.5	100	100	100	98	97.9
Set b	1	100	99	99.3	97.1	91.7	94.7	96.2	96	80	72.9
	2	95	98	94.6	97.7	81.1	90.4	94.3	95	81.9	72.9
	3	95	91	93.8	91.4	92.4	89.5	87.7	89.5	72.4	76
	4	98	96	93.8	93.1	91.7	86.4	86.7	90.5	76.2	76
	5	93	95	95.4	89.1	90.2	89.5	84.8	91.5	73.3	61.5
Set c	1	85.5	71.6	79.2	71.3	75.0	62.1	71.4	63.8		
	2	78	82.4	55.4	80.1	56.8	75.8	81.9	66.7		
	3	87	79.5	77.4	69.1	64.4	65.3	72.4	56.2		
	4	See below.									
Set d	1	62	72.5	42.3	47.8	30.3	21.1	41.9	28.6		
	2	62	60.8	46.2	42.6	34.8	43.2	26.7	32.4		
	3	64.5	72.5	37.7	48.5	31.1	36.8	23.8	33.3		
	4	See below.									

Set c 4 and Set d 4 were tested with School A, grades 4-7 only. The average percentage correct for grades 6 and 7 of School A with Set c, 1, 2 and 3 was 69.5; for grades 5A and 5B it was 68.7. Set c 4 gives 66.0 and 69.8 as corresponding percentages and may be regarded as roughly equal to c 1, 2, 3 in difficulty. In a similar way d 4 is found to be roughly equal to d 1, 2, 3 in difficulty.

The equality of the intervals of difficulty between successive "sets" and the placing of Set a as two-fifths as far from zero difficulty as Set d, are much more insecure—are, in fact, only the roughest sort of estimates. The scientific reader may think of the difficulty of Set a, Set b, etc., as follows:

Call the difficulty of Set a, A
Call the difficulty of Set b, B
Call the difficulty of Set c, C
Call the difficulty of Set d, D

Then D-C is probably between .4 (C-B) and 1.2 (C-B)
D-C is probably between .7 (B-A) and 1.3 (B-A)
C-B is probably between .7 (B-A) and 2.2 (B-A)
D-A is probably between .5A and 2A.

THE EXTENSION AND IMPROVEMENT OF SCALE ALPHA

Since many of those who read this report will wish to try not only Scale Alpha, but also other similar tests, in the case of the pupils of whom they have charge, I present here some of the tests which will probably help to extend the scale to greater difficulties, fill in intermediate sets, and add other elements equal in difficulty to those now given in a, b, c, and d.

H

Read this and then write the answers to 1, 2, 3, 4, 5, and 6. Read it again as often as you need to.

You need a coal range in winter for kitchen warmth and for continuous hot-water supply. but in summer when you want a cool kitchen and less hot water, a gas range is better. The xyz ovens are safe. In the end-ovens there is an extra set of burners for broiling.

1. What two varieties of stoves does the paragraph mention?
2. What effect has the use of a gas range instead of a coal range upon the temperature of the kitchen?
3. What is needed to provide a supply of hot water all day long?
4. For what purpose is the extra set of burners?
5. In what part of the stove are they situated?
6. During what season of the year is a gas range preferable?

I

Read this and then write the answers to 1, 2, 3, 4, and 5. Read it again as often as you need to.

Nearly fifteen thousand of the city's workers joined in the parade on September seventh, and passed before two hundred thousand cheering spectators. There were workers of both sexes in the parade, though the men far out-numbered the women.

1. What is said about the number of persons who marched in the parade?

2. Which sex was in the majority?

3. What did the people who looked at the parade do when it passed by?

4. How many people saw the parade?

5. On what date did the event described in the paragraph occur?

J

Read this and then write the answers to 1, 2, 3, 4, 5, 6, and 7. Read it again as often as you need to.

In Franklin, attendance upon school is required of every child between the ages of seven and fourteen on every day when school is in session unless the child is so ill as to be unable to go to school, or some person in his house is ill with a contagious disease, or the roads are impassable.

1. What is the general topic of the paragraph?

2. On what day would a ten-year-old girl not be expected to attend school?

3. Between what years is attendance upon school compulsory in Franklin?

4. How many causes are stated which make absence excusable?

5. What kind of illness may permit a boy to stay away from school, even though he is not sick himself?

6. What condition in a pupil would justify his non-attendance?

7. At what age may a boy leave school to go to work in Franklin?

K

Read this and then write the answers to 1, 2, 3, 4, 5, 6, 7, and 8. Read it again as often as you need to.

Hay-fever is a very painful, though not a dangerous, disease. It is like a very severe cold in the head, except that it lasts much longer. The nose runs; the eyes are sore; the person sneezes; he feels unable to think or work. Sometimes he has great difficulty in breathing. Hay-fever is not caused by hay, but by the pollen from certain weeds and flowers. Only a small number of people get this disease, perhaps one person in fifty. Most of those who do get it, can avoid it by going to live in certain places during the summer and fall. Almost every one can find some place where he does not suffer from hay fever.

1. What form of illness is described in this paragraph?

2. What is the effect of hay-fever on the eyes and nose?

3. What is the cause of hay-fever?

4. How large a percentage of people get hay-fever?

5. What means could they take to keep from getting it?

6. During what seasons of the year would a person have the disease described in this paragraph?

7. What is one difference between a cold in the head and hay-fever that is stated in the paragraph?

8. What effect is attributed to some weeds by the paragraph?

L

Read this and then write the answers to 1, 2, 3, 4, 5, 6, 7, and 8. Read it again as often as you need to.

We often think of a rich man as one who has much money, as if money and wealth meant the same thing. However, money is only one sort of wealth and some money is not exactly wealth. A twenty dollar bill, for example, is only someone's promise to pay so much gold. Wealth means land, houses, food, clothes, jewels, tools, gold, silver, coal, iron,—anything that a man can have that satisfies some want. Money means something which a person can exchange for any one of many sorts of wealth. The main value of any piece of wealth, such as a barrel of flour, a house, or a cow is the direct use you can make of it. The value it has by reason of what you can exchange it for is of less importance. The main value of any piece of money, such as a silver dollar, a ten-dollar bill, or a nickel, is *not* any direct use you can make of it. Its main value *is* by reason of what you can exchange it for.

1. What is the general subject of this paragraph?

2. How could a man be rich and still not own a single penny of money?

3. What two things are contrasted in this paragraph?

4. In what does the main value of wealth lie?

5. In what does the main value of money lie?

6. Name something that is wealth, but is not money?

7. Name something that is money, but is not exactly wealth?

8. What do you suppose is the thing which is defined by business men as "a medium of exchange?"

M

Read this and then write the answers to 1, 2, 3, 4, and 5. Read it again as often as you need to.

However certain it may seem to be that men work only because they must, and would avoid labor except for the food, clothing and luxuries that are its rewards, the facts may well be to the contrary. It can hardly be the case that men dislike work because they wish to be utterly idle. For mere rest, mere inactivity, is not commonly enjoyed. To have nothing to do is not what men seek. Were that so, we should envy the prisoner shut up in his cell. If men had to choose between a life spent at eight hours of work daily in a factory and a life spent at eight hours of sitting on a throne without moving hand or foot, many of them would, after trying both, choose the former. Activity of body or mind, at which a man can succeed, is, in and of itself, rather enjoyed than disliked.

1. What is it that this paragraph says may seem sure, but probably is false?

2. In what respect is a prisoner in his cell like a man with a million dollars?

3. If the absence of any activity were what we wished for, what would be our attitude toward a prisoner in his cell?

4. What is stated in the paragraph to be really liked and not objected to?

5. What choice is described in the paragraph as an argument that work, merely as such, is not always avoided?

N

1. Draw a line under every 7 in this line of numbers:

   5 4 7 4 9 1 2 7 6 3 7 2 9 8 7 2 1

2. In these two lines of numbers draw a line under every 5 that comes just before an 8:

   2 5 8 6 3 7 9 5 8 2 1 5 1 3 6 4 5 8 1 0

   7 3 5 1 6 2 9 3 5 8 7 1 3 2 5 8 1 3 5 2

3. In these three lines draw a line under every 2 that stands just between a 1 and a 3:

   9 5 2 7 6 1 2 3 4 7 1 5 2 4 3

   1 4 2 6 3 5 3 6 6 1 2 3 5 8

   1 2 3 9 8 7 5 1 5 6 2 7 3 4

4. In this line draw a line under every two numbers which stand side by side and whose sum is exactly 10:

   3 2 8 5 6 9 6 4 3 1 4 6 5 4 9 1 5 6

5. In these two lines draw a line under every 6 that comes just after a number smaller than it and just before a number larger than it:

   7 6 4 3 8 4 6 9 8 8 6 9 1 2 3 6 7

   3 6 6 1 7 2 6 8 5 2 2 6 5 7 1 6 9

7. Wherever in this line you see a 9 immediately preceded by a 1 and immediately followed by a 2, draw a circle around all three:

   6285192371539261948192359 2192

8. In these three lines draw a line under every 7 that comes just after a 4, if also there is a 7 just after the 6. But if the figure just after the 6 is not a 7, put the line over the 6 instead of under it:

   2 4 6 1 9 7 4 6 7 8 6 1 4 6 7

   5 6 1 3 4 6 3 2 8 9 4 6 7 1 6 3 4 6 8

   6 4 6 2 5 4 6 7 1 9 3 4 6 5 2 6

9. In these two lines draw a line under every 5 that is both preceded and followed immediately by a number larger than it, unless that number is 9. If a 9 occurs just before or after the 5, draw a circle around all three numbers:

   1 7 5 8 6 2 5 8 2 1 9 5 7 9 7 2 8 5 3 5 3 1 7

   7 5 9 4 7 1 6 5 6 3 1 0 8 5 9 7 8 5 6 2 4 5 8

A Provisional Scale for Measuring Ability to Pronounce English Sentences

During the year 1913-14, Mr. W. S. Gray made, with some help from the author, a preliminary study of tests of efficiency in oral reading. This work he expects to continue, and the result will be a series of sets of passages, each set being of equal difficulty and the sets in order being graded from little to great difficulty by exactly defined steps of difference.

The scale to be presented here represents his first rough approximation to such a series and is made public now because, with all its inadequacies, it is very much better than any other one means at hand for measuring ability in pronouncing English sentences.

The passages are the following:—

The Gray Tentative Scale for Measuring Achievement in Oral Reading

Passage *a*

It was time for winter to come. The little birds had all gone far away. They were afraid of the cold. There was no green grass in the fields, and there were no pretty flowers in the gardens. Many of the trees had dropped all their leaves. Cold winter with its snow and ice was coming soon.

Passage *b*

Once there lived a king and queen in a large palace. But the king and queen were not happy. There were no little children in the house or garden. One day they found a poor little boy and girl at their door. They took them into the palace and made them their own. The king and queen were then happy.

Passage *c*

Once I went home from the city for a summer's rest. I took my gun for a stroll in the woods where I had shot many squirrels. I put my gun against a tree and lay down upon the leaves. Soon I was fast asleep, dreaming of a group of merry, laughing children running and playing about me on all sides.

Passage *d*

One of the most interesting birds which ever lived in my bird-room was a blue jay named Jakie. He was full of business from morning till night, scarcely ever still. He had been stolen from a nest long before he could fly, and he was reared in a house, long before he had been given to me as a pet.

Passage *e*

The part of farming enjoyed most by a boy is the making of maple-sugar. It is better than blackberrying and almost as good as fishing. One reason he likes this work is that some one else does most of it. It is a sort of work in which he can appear to be very industrious, and yet do but little.

Passage *f*

It was one of those wonderful evenings such as are found only in this magnificent region. The sun had sunk behind the mountains, but it was still light. The twilight glow embraced a third of the sky, and against its brilliancy stood the dull white masses of the mountains in evident contrast.

Passage *g*

George Washington was in every sense of the word a wise, good and great man. But his temper was naturally irritable and high-toned. Through reflection and resolution he had obtained a firm and habitual ascendancy over it. If, however, it broke loose its bonds, he was most tremendous in his wrath.

Passage *h*

Responding to the impulse of habit, Josephus spoke and the others listened attentively, but in grim and contemptuous silence. He spoke for a long time, continuously, persistently and ingratiatingly. Finally exhausted through lack of nourishment, he hesitated. As always happens in that contingency, he was lost.

Passage *i*

The hypotheses concerning physical phenomena formulated by the early philosophers proved to be inconsistent and, in general, not universally applicable. Before relatively accurate principles could be established, physicists, mathematicians, and statisticians had to combine forces and work arduously.

Passage *j*

" Read the following sentences correctly: Sophistry is fallacious reasoning. They resuscitated him. Verbiage is wordiness. Equanimity is evenness of mind. He has a pertinacious, obstinate disposition. There was subtlety and poignancy in his remarks. A hypocritical or pharisaical nature is usually cynical."

A pupil is measured by having him read these passages in order, stopping at the end of each passage. The measurer counts the errors (or records them in detail on a duplicate of the scale, following the method below), and also records the time required for each passage. For a pupil to make four or more errors and take 30 or more seconds, or for him to make five or more errors, however quickly he reads, may be used as a convenient standard of failure to read the passage. A pupil who does as badly as this with any given step of the scale is likely to break down very decidedly soon thereafter.

The method used by Mr. Gray is described by him as follows:

" The data recorded were of two types. In the first place, the number of seconds required to read the paragraphs respectively was recorded. These data were secured with an ordinary watch. A stop-watch was tried but it was found to be no more satisfactory than the ordinary watch. The other data recorded grouped themselves under the five headings already described: namely, gross errors, minor errors, omissions, substitutions and insertions. In order to illustrate clearly the character of errors considered and the method of recording them the following paragraph is inserted:

The sun pierded into my large windows. It was the opening of October, and the sky was of a dazzling blue. I looked out of the window and down the street. The white houses of the long, straight streets were almost painful to the eyes. The clear atmosphere allowed full play to the sun's brightness.

"Gross errors were marked by underlining as in the case of 'atmosphere.' Minor errors, such as dividing 'pierced' into two syllables, leaving the 'e' out of 'opening,' sounding ā in 'dazzling,' omitting the 's' in 'houses' and 'al' in 'almost,' omitting the 'r' in 'straight' and sounding long ō in 'allowed,' were appropriately marked. Omissions were marked, as in the case of 'of' and 'and,' substitutions as in the case of 'many' for 'my,' and insertions as in the case of 'clear.'" *

That the scale even in its present form is adequate to measure differences between classes is shown by its results in the case of three groups, the 6B class in School A, the 6B class in School B, and a group made up of two sixth-grade classes in School C, as measured by Mr. Gray. The percentages succeeding with the different paragraphs of the scale (by a somewhat less severe standard than that recommended above) were:

Passage	*a*	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*
School A	95	100	85	80	50	30	15	10	5	0
School B	100	100	97	97	91	88	55	25	3	0
School C	100	100	100	100	98	98	92	82	30	8

School A has 80% of success at difficulty *d;*
School B has 80% of success at a difficulty somewhat above *f;* and
School C, at a difficulty of *h.*

The assignment of a numerical value to represent the amount

* Page 17 f. of a dissertation on file in the Library of Teachers College, Columbia University, entitled A Tentative Scale for Measuring Oral Reading, by William S. Gray, 1914.

of difficulty of any one of these passages is at present extremely insecure. If such assignment has to be made, the following values will probably serve better than the reader's own guess:

Passage a = 4.5
" b = 5
" c = 6
" d = 7
" e = 8
" f = 9.5
" g = 11
" h = 12
" i = 14
" j = 15

The whole matter of exact definition of the relative difference between the successive steps of this provisional scale is, however, one for study. The *order* of difficulty is established but the *amounts*—b-a, c-d, d-c, etc.—are as yet unmeasured.

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TEACHERS' ESTIMATES OF THE QUALITY OF SPECIMENS OF HANDWRITING

It is the purpose of this number of the RECORD to provide teachers with means of making their "marks" or estimates or measurements of handwriting more accurate and more useful. Definite experiments will be described and the materials for them furnished, so that any teacher who follows the directions given may learn how good (or bad) a judge of handwriting he now is, and may, whether good or bad, improve his judgment in this respect.

A specimen of handwriting should be judged both quantitatively and qualitatively—both as to the speed with which it was produced and its quality. The speed with which it was produced is measurable, of course, by the number of letters written per unit of time. A test of handwriting should ordinarily be made by having the pupil write some material that he knows perfectly, such as a well-learned poem or the series "one, two, three, four, five, six, seven, etc.," or the series "Monday, Tuesday, Wednesday, etc.," repeated as required. Four minutes is a suitable time. For tests of the ease of production longer periods should be used, though it should be noted that long-continued writing by hand very rarely is required by modern industry, business or professional work. For a measure of the total efficiency of a pupil at handwriting, the speed and the ease of production should be combined with the quality of

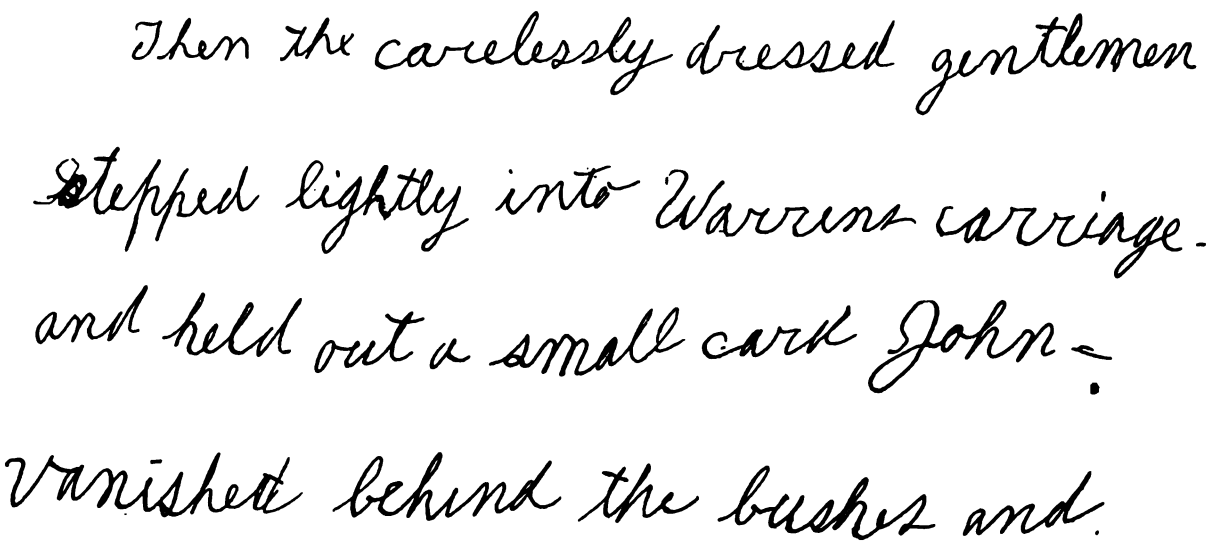

Then the carelessly dressed gentlemen
stepped lightly into Warrens carriage.
and held out a small card John.
Vanished behind the bushes and.

FIG. 1

the product produced. We are here to be concerned, however, only with the quality of the product irrespective of the rate at which it was written or the strain of writing it.

For estimating the progress a pupil has made, or for comparing facts about him with similar facts about other pupils, the conditions under which he produces the product would need to be known. The specimen of Fig. 1, for example, would be an extraordinarily excellent achievement for an eight-year-old child writing eighty letters a minute in a very bad light, with a pen that he was not used to, and would be a very inferior achievement for a twelve-year-old child writing slowly under excellent conditions. Inference about a pupil from a specimen of handwriting may involve many such considerations. With all such conditions of age, grade, illumination, health, zeal, etc., etc., we shall here have nothing to do. We are not now measuring pupils, but simply certain products—specimens of handwriting—for their quality alone, regardless of the conditions of their production. For that purpose we do not even have to know whether a specimen of writing was made by a man or a dog, with hand or with foot, at a rate of two or two hundred letters per minute, with a pen or with a stick.

Problem I

For a teacher to discover just how accurate his present unaided judgment of the quality of handwriting is.

In order to enable a teacher to discover how good or bad his present judgment of handwriting is I have arranged the following experiment.

Call a practically perfect specimen of handwriting 99, and a handwriting of which no single letter can be read (like Fig. 2, page 4) zero. Examine the fifty specimens 5, 8, 9, 11, 22, 25, ... 256 (after page 8), and give each the grade between 0 and 99 that you think it deserves without consulting anything in the way of aids. Enter these grades on Record Sheet A after p. 4 (which may be cut out to be so used) or on a copy of it, in the column headed "value assigned by unaided judgment." When all fifty have been so graded and entered, turn to Table I, page 11, and enter on your record sheet the

RECORD SHEET B

differences between your grade and the true grades there assigned, using a minus sign when your grade is below the true grade, and a plus sign when your grade is above the true grade. Add the amounts of the minus differences. Add the amounts of the plus differences. Add the two sums so obtained, *regardless of signs* (i.e., 124.13 minus diffs. and 162.26 plus diffs. are to give 386.39, not 38.13).

If your final total sum is under 150, you already have excellent standards of quality in handwriting and are very accurate in their use. If your total sum of divergences from the true value is from 150 to 199, you have good standards and are accurate in using them. The higher your sum of differences is above 200, the more you need either some scale of systematized standards of quality to judge handwritings by, or practice in using such a scale, or both.

Problem II

For a teacher to see to what extent the use of a scale or system of standards improves his judgment of the quality of handwriting.

Examine the Scale for Handwriting found in Supplement B. This scale is a series of specimens improving steadily in quality from 4 up to 18. Take specimen 5, of specimens 5, 8, 9, 11, ... 256 (after page 8), and decide upon the number of the scale between 4 and 18 which seems to you to be nearest to specimen 5 in quality. Pay no attention to any notions you may have about the speed at which it was written, the ease with which it was written or the age or training of the one who wrote it. Simply grade specimen 5 itself by giving it the value 4, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, up to 18.0 which you think best represents its quality. Enter the value that you assign to specimen 5 in the fourth column of Record Sheet A. Judge specimens 8, 9, 11, 22, 25, etc., just as you did Specimen 5, and enter each value in column 4 of Record Sheet A as soon as you decide upon it.

When all fifty estimates are entered, multiply each of them by 5.5, entering the products in column 5 of Record Sheet A. This multiplication can be done very rapidly with the use of Table II, on page 12. Then find the differences between these

values of column 5 and the true values for the specimens given on page 11, and enter these in column 6. Find the sum of the minus differences, the sum of the plus differences and the total sum (regardless of signs).

The decrease of these sums for column 6 below those for column 3 measures the advantage got by using the scale, and by consequently improving one's inadequate standards of the different degrees of merit from 0 to 99.

Problem III

To compare one's accuracy in using the Scale with that of competent teachers in general.

Copy the entries of column 4 of Record Sheet A in column 2 of Record Sheet B (under the heading "Value (0 to 18) assigned by the aid of the Thorndike Scale before special practice"). Find the differences between these values and the true values given on page 11. Enter these differences in column 3 of Record Sheet B. These differences are, it will be noted, the same as those of column 6 of Record Sheet A would be if divided by 5.5. That is, we have now changed to a scale of 0 to 18, instead of one of 0 to 99. All the further estimates of quality will be made in terms of this 0-18 scale. It is in almost every way preferable, and would have been used hitherto except for the unfortunate custom of calling a perfect product 100. This custom of marking within an artificial range of 0 to 100 is in almost every respect inferior to the custom of marking from 0 up in steps of some intelligible and objectively definable unit. The unit of the Thorndike Scale is one-tenth of the difference between the worst and the best writing found in a thousand pupils of grades 4 to 8.

Add the plus differences of column 3 of Record Sheet B. Add the minus differences. Add the two sums, regardless of signs. Divide by 50. The result is the average error made in estimating a sample, unity being one step of the scale (which is approximately one-tenth of the difference between the worst and best writing found among 1,000 children of grades 4 to 8).

Individuals differ in their precision in using the scale. On the average a competent teacher who is without training in

the use of the scale will make an error of nine-tenths of a step in judging a sample But some such teachers will make an average error of only a little over seven-tenths of a step, while others will make errors nearly twice as large. With practice the judgments of all will become more precise, but those who were most accurate at the start will as a rule retain their relative superiority.

I show the facts in detail for thirty-six teachers in Table III. In Table III, Median Error means the amount of error that a competent teacher will not exceed in half of her judgments. Average error means the average amount of error made. All the facts are for ratings of about 110 specimens without previous experience with the scale.[1]

If one makes an average error of .9, then his judgment is about equal to that of the general run of competent teachers. .7, .8, .9, 1.0, 1.1, 1.2 and 1.3 may be called, as results before special training with the scale, excellent, very good, good, upper ordinary, lower ordinary, poor, and very poor.

Problem IV

To improve one's precision in estimating the quality of specimens of handwriting.

To improve the accuracy of our estimates of the quality of handwriting, we may use this same series of fifty specimens, (5, 8, 9, 11, 22 ..... 256) whose true values are known.[2]

These are to be used in this case as follows: Cut them out, write on the back of each its true value as given in the table on page 11. Take a specimen, examine it with the scale in view, and assign to it the value (to the first decimal, e.g., 4, 4.1, 4.2, 4.3, 4.4, etc., up to 18.0) which in your judgment it deserves. Then turn it over, note its true value, and enter on

[1] For the sake of the scientific reader I may add that for individuals 1 to 20 in order the Mean Square Errors were 1.21, 1.17, 1.20, 1.405, 1.37 1.16, 1.15, 1.15, 1.27, 1.17, 1.505, 1.32, 1.39, 1.20, 1.02, 1.27, 1.03, 1.11, and 1.36. These have not been computed for the other sixteen individuals.

[2] A separate set of these on loose sheets for convenience, with a record sheet for results and a copy of the scale itself, may be obtained by sending 15 cents in stamps to the Bureau of Publications, Teachers College, New York. Ten such sets, with record sheets and scales, will be sent upon receipt of one dollar, and sets in quantities of 50 or more, at the rate of $8.00 per hundred, carriage extra.

the Record Sheet B, in the column marked Differences Minus or Plus from True Values: First Round of Practice, the amount by which your estimate of its value differed from its true value. Use, —, if you rated it too low, +, if you rated it too high. Thus suppose that you rated Specimen 11 as 15.5. Its true value is 14.0 and you would enter +1.5 on the record sheet.

Do the same with each specimen of the fifty until the column of the record sheet is filled. In the first round take the specimens in the order 5, 8, 9, 11, 22, 25, 27, etc. Add your errors for the first ten, the second ten, and so on, *regardless of their signs* (i.e., +.4, —.2, —.5 and +1.3 are to give a sum of 2.4, not 1.0) and fill the appropriate blanks for entry on the scoring sheet.

Then repeat the grading of the entire fifty, but this time (and in all further practice) taking them in a random order, so as not to be influenced by the entries previously made on the record sheet. Enter each error as before, using the column for the Second Round of Practice. Find as before the sum of your errors for the fifty (regardless of signs). Unless you were at the start highly skilled in judging handwriting, you will find a notable improvement (i.e., reduction in the average error) of the first round over the preliminary ratings of column 2 (Record Sheet B), of the second round over the first round, and of the last twenty of the first round over the first twenty.

Practice may be continued for a third, fourth, and fifth round or until the true values of some of the specimens come to be remembered. After that point, of course, any reduction in errors would be a mixture of improved judgment and special memories about these particular specimens.

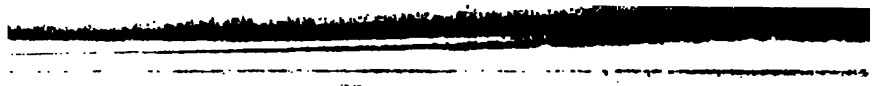
Problem V

To measure the effect of the practice in judging the fifty specimens (5, 8, 9, 11, *etc.*) *upon ability to estimate specimens of different size and of different style.*

To make the experiment of Problem IV still more instructive a teacher may measure his ability with another set of specimens of a different sort *before* and *after* the practice just

SUPPLEMENT A

Fifty Specimens of Handwriting
(5, 8, 9, 11, 22, 25....256)



described. I have provided two such sets—one a set of forty specimens of very small writing (72, 73, 74, etc.), the other a set of forty specimens of writing by children and adults mostly after the style of the Palmer System (501, 504, 506, etc.). These should be examined and rated by the scale (to a first decimal) just as directed on page 7, and the ratings entered in the appropriate places on the Record Sheets C and D after p. 12. The reader will not find the true values for any of these eighty specimens, as they have not been so standardized as yet. He will therefore enter his estimate itself, not the difference between it and the true value. If he will then send the scoring sheet with these ratings to me (E. L. Thorndike, Teachers College, Columbia University, New York), I will later return this scoring sheet with the true ratings attached. He can thus measure the effect of the training in judging vertical and slant writings of ordinary size in improving his judgment of small-sized writing and writing of the Palmer style, by comparing the sums of differences before and after the special practice with the 5, 8, 9, 22 series.

Problem VI

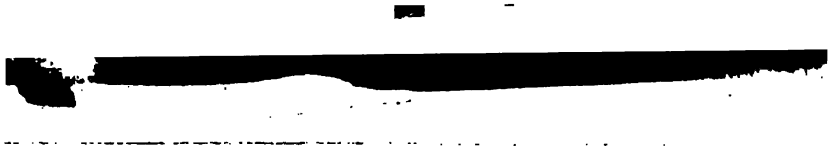
The number of measures of handwriting necessary to get a sufficiently accurate measure of the quality of writing of an individual and of a class.

The facts given in Table III on page 13 show that a single teacher's judgment of a specimen of handwriting will on the average place it .9 of a step away from its true value. It is also the case that the true value of a single specimen of a pupil's handwriting will not exactly tally with the true value of his average writing (say, the value of the specimens produced on ten successive days). To measure the quality of his handwriting precisely, there should be at least four specimens produced on four different days, each being judged by a different teacher or other competent person. The average of four such estimates will place pupils with few exceptions within two thirds of a step of their true place on the scale. For almost every purpose for which measurements of the quality of handwriting are needed in schools, civil service examinations, tests of fitness

for clerical work and the like, this degree of precision will be sufficient.

When it is desired to compare *one class with another*, or *a class at one time* with the *same class later*, very much greater precision can be attained. The average for a class of 36 when measured as directed in the previous paragraph will with few exceptions be within one-ninth of a step of the true average for the class. Indeed, if the 144 specimens are divided at random into four groups, and each of the four teachers judges only one group, the average result will be precise enough for almost any purpose for which measurements of the ability of a class as a whole are made in schools.

In any case the measurements made with the scale, even by teachers untrained in its use, will be more precise than the marks now commonly given. If the teachers are given, say, three hours of practice in the use of the scale, there will be a further gain in precision.



SUPPLEMENT B

Thorndike Scale for Handwriting of Children in grades 5 to 8

TABLE I

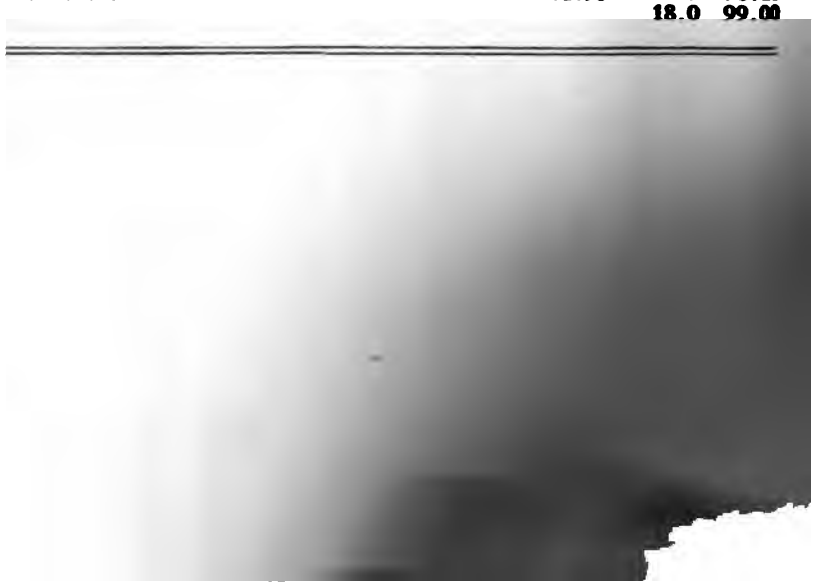
TRUE VALUE OF SPECIMENS 5, 8, 9, 11 256

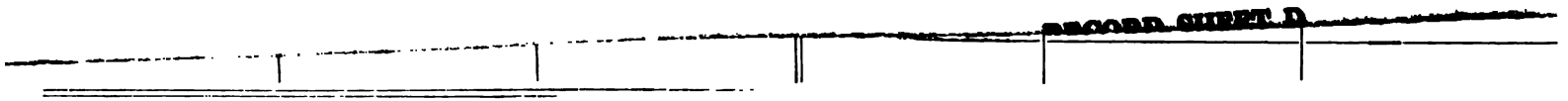
	On Scale of 0–18	On Scale of 0–99		On Scale of 0–18	On Scale of 0–99
5.....	11.7	64	208.....	8.5	47
8.....	12.8	70	209.....	6.8	37
9.....	13.2	73	211.....	7.2	40
11.....	14.0	77	212.....	10.5	58
22.....	8.3	46	213.....	12.6	69
25.....	12.7	70	214.....	11.5	63
27.....	15.5	85	215.....	15.5	85
29.....	15.4	85	216.....	15.7	86
33.....	15.8	87	221.....	10.2	56
34.....	9.2	51	222.....	8.8	48
36.....	11.5	63	223.....	9.5	52
37.....	16.4	90	225.....	6.8	37
39.....	15.3	84	226.....	7.8	43
41.....	10.6	58	227.....	8.5	47
46.....	12.4	68	229.....	5.8	32
50.....	12.2	67	230.....	13.5	74
53.....	13.5	74	234.....	17.5	96
57.....	15.2	84	242.....	12.5	69
119.....	5.5	30	244.....	14.8	81
134.....	15.2	84	245.....	8.8	48
201.....	9.2	51	247.....	13.8	76
202.....	8.8	48	249.....	12.3	68
203.....	13.5	74	250.....	14.7	81
206.....	13.7	75	255.....	14.6	80
207.....	9.8	54	256.....	14.2	78

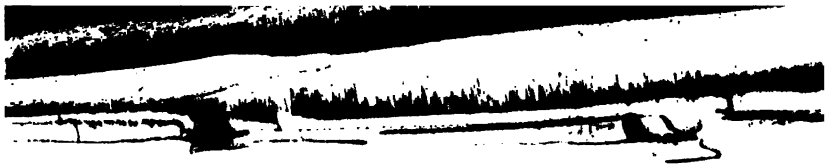
TABLE II

PRODUCTS OF 3.0, 3.1, 3.2, 3.3, ETC., BY 5.5

3.0	16.50	6.0	33.00	9.0	49.50	12.0	66.00	15.0	82.50
1	17.05	1	33.55	1	50.05	1	66.55	1	83.05
2	17.60	2	34.10	2	50.60	2	67.10	2	83.60
3	18.15	3	34.65	3	51.15	3	67.65	3	84.15
4	18.70	4	35.20	4	51.70	4	68.20	4	84.70
5	19.25	5	35.75	5	52.25	5	68.75	5	85.25
6	19.80	6	36.30	6	52.80	6	69.30	6	85.80
7	20.35	7	36.85	7	53.35	7	69.85	7	86.35
8	20.90	8	37.40	8	53.90	8	70.40	8	86.90
9	21.45	9	37.95	9	54.45	9	70.95	9	87.45
4.0	22.00	7.0	38.50	10.0	55.00	13.0	71.50	16.0	88.00
1	22.55	1	39.05	1	55.55	1	72.05	1	88.55
2	23.10	2	39.60	2	56.10	2	72.60	2	89.10
3	23.65	3	40.15	3	56.65	3	73.15	3	89.65
4	24.20	4	40.70	4	57.20	4	73.70	4	90.20
5	24.75	5	41.25	5	57.75	5	74.25	5	90.75
6	25.30	6	41.80	6	58.30	6	74.80	6	91.30
7	25.85	7	42.35	7	58.85	7	75.35	7	91.85
8	26.40	8	42.90	8	59.40	8	75.90	8	92.40
9	26.95	9	43.45	9	59.95	9	76.45	9	92.95
5.0	27.50	8.0	44.00	11.0	60.50	14.0	77.00	17.0	93.50
1	28.05	1	44.55	1	61.05	1	77.55	1	94.05
2	28.60	2	45.10	2	61.60	2	78.10	2	94.60
3	29.15	3	45.65	3	62.15	3	78.65	3	95.15
4	29.70	4	46.20	4	62.70	4	79.20	4	95.70
5	30.25	5	46.75	5	63.25	5	79.75	5	96.25
6	30.80	6	47.30	6	63.80	6	80.30	6	96.80
7	31.35	7	47.85	7	64.35	7	80.85	7	97.35
8	31.90	8	48.40	8	64.90	8	81.40	8	97.90
9	32.45	9	48.95	9	65.45	9	81.95	9	98.45
								18.0	99.00

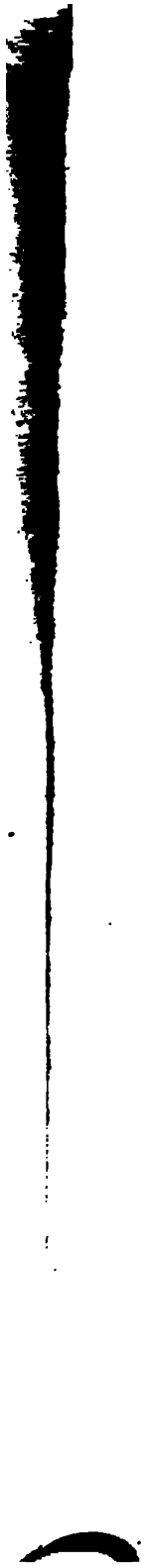



RECORD SHEET D



SUPPLEMENT C

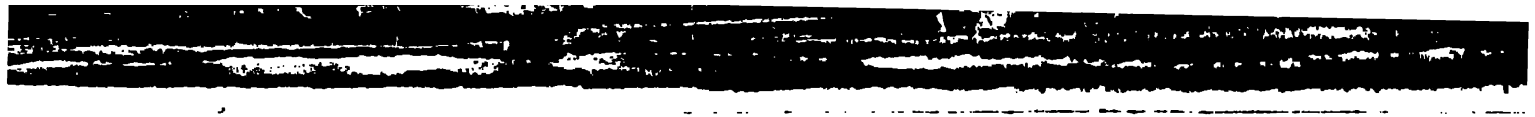
Forty Specimens of Handwriting
(72, 73, 74, etc. Very small writing)



SUPPLEMENT D

Forty Specimens of Handwriting
1, 504, 506, etc. Writing by children and adults
mostly after Palmer System)

3208



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